JPRS-UEN-84-028

26 September 1984

USSR Report

ENERGY

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FUELS

GENERAL

OIL AND GAS

VETERAN GEOLOGIST URGES RISK-TAKING IN OIL PROSPECTING

Moscow IZVESTIYA in Russian 22 Apr 84 p 3

[Article: "The Right to Take Risks"; interview with Andrey Alekseyevich Trofimuk, petroleum geologist, Member Academy of Sciences USSR by A. Illarionov, special correspondent for "IZVESTIYA"]

[Text] Science has equipped people with complicated and sensitive instruments capable of penetrating meters and even kilometers into the depths of the earth. Yet the same delicate instruments have been unable to replace the abilities, inherent only in man, to compare and analyze and to put forward bold hypotheses.

The academecian A.A. Trofimuk was not an oil worker by birth, but was nonetheless able even in his youth to make out oil deposits in the limestone formations of the Ishimbay region. His candidate's dissertation became the basis for a new trend in Ural oil exploration when new deposits were first discovered. I met with him to inquire in more detail about his explorations and findings, and the role of scientific foresight.

[Question] Could you share with us the secret of why fortune has smiled on you for the last decade?

[Answer] It would be a bit difficult to answer in just a few words, but I'll start at the beginning....

The year I entered Kazan University, geologists were stunned by the news that the first petroleum had been found on the western slope of the Urals near the small towns around Chusovoy. This event served as grounds for me to rush into work on the rapid development of the new oil fields in those areas.

They tried to persuade me to remain in the university, but I requested to be allowed to take correspondence courses. And so I set out for the Vostokneft' Trust.

But one cannot study everything a little at a time. So I turned my attention to the oil fields which had been discovered by then, the famous Ishimbayskiy ancient buried reef massifs, which were saturated with oil. We had to puzzle out their character in order to understand where to look for the new oil-bearing massifs.

Oil exploration also brought me to the Western Bashkir. There were no reefs there, but there were deposits of a coal-bearing system. The deposits turned out to be oil- and gas-bearing. After that, oil was discovered at the ancient Devonian level. So gradually, the features of the oil deposits in these areas added up. This was fortunate for the researcher, for in the earliest years of the war, when our country suffered a severe liquid fuel shortages this accumulated knowledge helped discover oil fields of a new type.

The high-yield Kinzebulat field was found and the very first well there produced six railroad cars of oil every twenty-four hours. The veritable stream of fuel this field produced went to the airfields and the tank units. So geological science helped to win the war against Fascism.

[Question] And wasn't this discovery mentioned when you were the first geologist to receive the title of the Hero of Socialist Labor?

[Answer] Yes.

[Question] During those years so long ago geologists probably had no modern equipment or accurate system of exploration. But even today science often has to work with some degree of uncertainty. Does that mean scientific exploration today is unavoidably identified with a certain amount of risk?

[Answer] Without risk, scientific exploration would vegetate. Too much time would be spent in achieving results. Many people underestimate this, but nothing is more valuable than time.

That's why well-grounded risk is the motive force of scientific progress. On the basis of some hypothesis, you get to drill ten wells. That's already a risk. You have finished drilling your wells, but have found no oil. This, incidentially, is an example of my experience from the war years, when the expenses for every meter we drilled were kept on the strictest accounting. It would seem that such results would be a complete disaster. But no, the research from these ten wells also let to the Kinzebulat discovery that paid the expenses with interest, and in time helped us win the war.

[Question] The move you made to Siberia, by the way, had, some degree of risk in your day. You had to leave your position as director in the important NII (Institute of Science and Research in Moscow, where things were stable. Wasn't it frightening to start all over, setting off for remote, cold, scientifically-underdeveloped Siberia?

[Answer] No. I spent my childhool in Siberia. Back at the beginning of the

First World War our family was evacuated to Nizhneudinsk, where my father's brother lived. That's where I became homesick the tayga. There is where we buried my mother. She was a cook in a typhus hospital. And my father, a railroad man, was forced to move us from place to place. In Slavgorod, on the steppe, which is not so far from present-day Akademgorodok, I received a seventh grade eduction.

But this is one side of the coin. Here's the other: in the 50's despite my objections, I was sent to Moscow as chief geologist of the main administration, and later appointed director of the institute. By then in Siberia there were oil exploration operations. And there came to mind the prediction of my teacher, the academecian Gubkin, who suggested the existence of Siberian oil deposits as far back as the years of the first five-year plan.

[Question] Today, Gubkin's prediction of oil on the great Siberian plain can be called an idea of complete genius. But there was more opposition to this prediction than was necessary. I remember the Tyumen' oblast in 1956. At that time they spoke to us journalists assuredly about gas, but oil was thought of as a risky matter.

[Answer] For a whole year before the first oil was recovered at Tyumen, several important industry managers were persuaded that we should stop drilling for oil there, that it was extremely expensive, that there was no future in it, or we should decrease production. There was reluctance to take responsibility for the risk....

[Question] Andrey Alekseyevich, what are you chiefly interested in today on the great Western Siberian Plain?

[Answer] Since the days when I first started working in Siberia, the problem of how to justify exploration for new fields has disturbed me. Recovery grows smoothly only when workable reserves are promptly prepared. Where is the oil, what's there, under what conditions? How most successfully to extract the wealth from down under? That is the circle of my interests.

There's an army of geologists here, all involved in exploration with their advanced instruments, peering several kilometers down through the earth. An army of drillers operates according to the geologists' recommendations. And if these armies' objectives are vague, their results will be drastically reduced.

The problem is to find new fields and prospective regions without requiring large additional investments from the government. You see, having a proper strategy and reasonable risk, we were able to discover oil in Western Siberia right up to the beginning of the war. How this would have helped win the war!

[Question] Does this mean that nowadays success is based on the method of exploration, and that the days of risk in exploration have been left behind?

[Answer] Let's look for the answer to this question together. Up to now, out of three geological levels of the Western Siberian lowland, our oil workers have developed only the uppermost, the Cretaceous, or "chalk" period as we call it. You can argue about how many deposits will be discovered at this level, but something else is incontestable: if we stay at this level too long, there will be no need to expect an increase in recovery levels.

Among the scientists of the Siberian Area NII in geology, geophysics, and mineral resources, with whom I work, they have succeeded in delineating the relationship of the oil deposits in the second level, (counting from the top): the Jurassic. So why would drilling a small number of wells, and not putting this important matter off until tomorrow, not explain where the oil on this level is located? There is most certainly risk here, but it is so much less a risk than what they were doing in Bashkir during the war.

Another important direction in upcoming exploration is in Eastern Siberia. An oil-bearing zone which was scientifically predicted to be there has already shown up in practice. Of course, the geographic and geological conditions of the proven fields there are difficult and complicated. But today, too, it's time to proceed from the idea that man is gradually affecting an improvement in these conditions. In those regions, in particular, the Baykal-Amur Mainline (BAM) is being prepared for operation. It is opening up a way for Eastern Siberian oil to the Far East, and this solves a major national problem.

The time has come to consider whether we ought to intensify oil exploration and prospecting operations in Eastern Siberia on the basis of transportation opportunities given us by the BAM.

[Question] And my last question is, perhaps, a bit unexpected. Are there, in your view, any scientific and practical problems in which the risk is simply inadmissable?

[Answer] There most certainly are. And the first problem is environmental protection. Here's where the researcher must be principled and firm. If an oil field project tolerates oil loss, there's no chance for it to be sold. This is especially important in Siberia, with its severe natural conditions. There, where the trees, grasses and animals live on the brink of biological viability, it's particularly criminal to subject them to risk.

You can learn to substitute one raw material for another, but in the process you become accustomed to doing without something which you have been used to having, something which was previously available. But to risk the inimitable living nature of the North, of all Siberia, to have it violated by a rough intervention, is impermissible.

In such matters the scientist as well as the production worker must be uncompromising. Not for nothing was it said at the 26th Party Congress: the scientist must be a "disturber of peace".

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CSO: 1822/318

URENGOY GAS INCREASE CITED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 May 84 p 1

[Article by M. Umanskiy in Novyy Urengoy: "Toward the Billion Mark"]

> [Text] Urengoy oil field workers this year are expected to bring about an unprecedented increase in natural gas recovery. The collective is making a most substantial contribution toward reaching the billion mark for daily recovery of Tyumen's "blue fuel".

Before year's end, four new complete gas-refineries will all at once appear in this unique gas field on the polar tundra. Raw gas, brought up from the depths, will be converted into marketable products here prior to its many-thousands-of-kilometers' marathon journey to the west. We are headed for one of the installations, which should begin construction shortly.

The silvery aluminum structures which have arisen over the tundra are visible from quite a distance. And here we have R. Suleymanov, chief engineer for the Urengoygazdobycha Association, showing us the shops where they are carrying out the final operation prior to start-up: pressure-testing the equipment. This is a very crucial matter: the equipment and pipelines must sustain the tremendous gas pressure which has escaped from the depths to the surface.

The new plant is situated not far at all from the spot where work began six years ago. But the difference is evident, even to the inexperienced. If the shops of the first refinery were literally stuffed with complicated equipment and enmeshed in a dense network of pipelines and industrial supply lines, the new installation is well-lighted and spacious. Instead of the massive bodies of separators and absorbers, and steel filtration tanks, elegant multipurpose tower units rise up. While carrying capacity of the industrial lines has been sharply raised, the amount of metal used per structure has been reduced. And assembly time has been cut in half in blocs of high plant readiness.

The Urengoy gas workers have increased labor productivity by 2.8 percent since the beginning of the year. And by further reducting output production costs, still another item of the accepted obligations is successfully fulfilled. This is only one example.

Diethylene glycol is a scarce chemical reagent used in gas drying. The less of it flows away with the gas in the pipeline, the lower the production costs of recovery. What filtering materials didn't the innovators A. Zavorykin, A. Kul'kov, B. Akhmetshin and V. Zakharenikov only test as a reliable barrier in the pipeline! Waste products of textile production, never before used were chosen.

Drillers play a leading role in raising gas recovery levels. Here, where conditions are complicated by eternally frozen ground, they must drill through 225,000 meters of rock in drilling 180 wells. Frankly speaking, the task is not one of the easiest. But the better crews of G. D'yachenko and A. Glinyanov have already proven that here in the sub-arctic, high-speed gas well drilling is possible.

Geologists have found out that in the Urengoy gas-condensate "pie", beneath the upper "filling" where basic gas reserves are concentrated, there are, situated one on top of the other, thirteen more of the deep, so-called Valanginian strata, rich with condensate. Recovery levels of this valuable product will greatly increase by the end of this five-year plan. It is no accident that they are calling this the Valangine year in the Urengoy region.

After a brief time, parallel with gas recovery growth, a basically brand new condensate recovery, refining, and transport industry will have to be built right at the field. The onset of the Valangine operation is picking up speed. Before year's end, construction workers will have to put a number of structures into operation. These will be for preparation of the gas and its associated liquid minerals for long-distance transport. Prior to that, drillers must sink tens of wells.

The experience of getting the northern fields into operation shows that not until gangs of construction workers and power engineers work at a schedule-beating pace will the efforts of the gas workers give the desired result. But for now, unfortunately, the gas workers have a lot of serious grievances.

I. Nikonenko, director of Urengoygazdobycha, and USSR State Prize winner, says, "One of the most important projects under construction for this year is the 700-kilometer condensate pipeline which will unite Urengoy with Surgut. The bulk of the main pipeline should have been laid in the winter, before the onset of the spring thaws with their muddy roads. But the Minneftegazstroy construction workers on the Urengoy section of the right-of-way are just now getting underway and, what's more, are just getting set up.

Mintransstroy sub-units are in no hurry to lay the concrete bed to the 11th and 12th successive stations. The power workers are slow in laying the power transmission lines up to the 13th (and next) station."

Possibilities for overcoming this lag do exist. Since the railroad has been reliably linked the Urengoy field with the country's industrial centers, material and equipment supply has markedly improved. And that is the affair of the construction workers.

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CSO: 1822/318

OIL AND GAS

FUEL INDUSTRY ACCOMPLISHMENTS AND OBLIGATIONS CITED

Moscow AGITATOR in Russian No 9, May 84 p 24

[Unattributed article, Fuel: A Memorandum to the Agitator"]

[Text] The Soviet Union is the single major industrially developed country which provides all its own fuel and energy from its own natural resources and exports them in significant quantities.

From 1950 to 1982 USA fuel-industry output increased 2.1-fold while output in the USSR increased 7-fold, corresponding to 14 and 59 percent since 1970. Petroleum recovery (gas condensate included here) in the USSR in 1960 equaled 42 percent of USA levels, but in 1982 equaled 144 percent gas recovery corresponds to 12 and 86 percent respectively. The USSR's share of world oil recovery rose during this time from 14 to 24 percent, and gas recovery from 9 to 30 percent. USSR production of marketable coal in 1982 comprised 90 percent of the USA level, and almost 17 percent of world volume (USSR share of the world population is less than 6 percent).

First place on our fuel balance sheet goes to petroleum, with more than 40 percent.

From 1970 through 1983 petroleum recovery increased by 75 percent, and since 1960 by 4.2-fold. Last year 616 million tons were recovered, or more than during the entire 6th Five-Year Plan and 18 percent over total world recovery for 1950. In the first three years of this five-year plan the average yearly increase of petroleum recovery comprised about 4.3 million tons, and is projected by the present plan to increase by 8,000,000 tons.

The mazut produced from such a quantity of petroleum is enough to generate 16 billion kilowatt-hours of electric power, enough for the country's population for almost two and a half months. And the motor oil extracted from 8 million tons of petroleum will run 100,000 vehicles for a year.

Gas recovery is developing especially well.

It has increased 2.7-fold since 1970, and almost 12-fold since 1960. Last year, 536 billion cubic meters were recovered, or 17 percent more than during the entire 7th Five-Year Plan, and more than total world recovery for 1960.

The first three years of the present five-year plan have shown a 34 percent average increase, and presently it is planned at 42 billion cubic meters. This is enough, for example to supply all enterprises, organizations and the entire population of Moscow for two years. By and large, gas recovery for four years of the five-year plan will exceed that of the entire preceeding plan.

Coal's share on the fuel balance sheet has decreased from 54 percent in 1960 to less than 24 percent.

A speed-up of coal production, with stabilization and a subsequent growth of the coal share in the overall volume of organic fuels is foreseen as part of the USSR energy program. Coal recovery showed no increase during the first three years of this five-year plan, remaining at 716 million tons. According to the 1984 plan, recovery should increase by 7 million tons. About 1,200 heavy-duty railroad cars will be needed for transport. This amount equals a ten-months' supply for the large Troitskaya GRES.

Recovery of the three basic fuel types (not counting firewood, oil shales or peat) should increase this year almost 66 million tons (standard fuel conversion), which, combined with savings to the national economy, predicted by the plan, of approximately 40 million tons of standard fuel, should be satisfactory to meet current demand, including export.

Many fuel industry collectives have taken on increased socialist obligations for the fouth year of the five-year plan.

The Yuganskneftegaz Association collective at Tyumenshchin took up the obligation to recover no less than 600,000 tons of oil above the plan; the Akhtyrskiy Oil and Gas-Producing Administration (in the Ukraine)--200,000 tons above the plan; the Tyumengazprom Association collective promises to produce 2 billion cubic meters of gas above the plan and the Donetskugol' Association is set on bringing 300,000 tons of above-plan coal to the surface....

Fuel workers! The uninterrupted functioning of the entire national economy depends in great measure upon you. Increase coal, oil, and gas output, and successfully fulfill the plans and your socialist obligations!

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12659
CSO: 1822/318

OIL RECOVERY INCREASE VIA EQUIPMENT UPGRADING DISCUSSED

Moscow EKONOMICHESKAYA GAZETA in Russian No 22, May 84 p 18

[Article by N. Karkhalev: "The Oil-industry Workers' Technical Arsenal"]

[Text] The growth of our country's petroleum industry in the last few years is characterized by a number of features. Heretofore unseen levels of oil recovery have been achieved. By this index, we have held a strong lead for many years. The USSR's share of world oil (with gas condensate) has increased by 20 percent.

The geographical distribution pattern of the petroleum industry has changed radically. Only 20 years ago the first tons of petroleum were sent to refineries from Western Siberia, and this region now contributes over 60 percent of our crude oil. At the same time oil production has decreased somewhat in the Ural-Volga, Northern Caucasus, Trans-Caucasus, Central Asia, Ukraine and Belorussian regions, which have long been in operation. A great many less productive fields are involved in development, predominantly those in remote regions with challenging climatic conditions.

MAXIMUM OIL FROM EVERY WELL

The problems of stable petroleum industry growth and raising recovery levels in new fields while retarding the drop in recovery levels in old fields predetermine the need for accelerated construction and bringing producing and injection wells up to capacity via normal methods and water injection into strata. According to Minnefteprom, their overall resources have increased by one fourth since the beginning of the current five-year plan and now make up more than 123,000 units. According to Glavtyumenneftegaz they have increased by 2.4-fold and exceed 26,000 units.

Keeping such a number of wells in working order is not easy. Many of them have not been operating even ten years, and they are scattered over a vast territory. A vast amount of maintenance work is carried out to this end including many much organizational and geolgoical and technical measures. Competition, under the motto, "Maximum oil from every well!", has developed within the sectors. This is a movement for faster work completion, and improvement of the quality of repair and creates new maintenance methods.

Optimization of operating schedules is being carried out by computer. The Bashkir oil field workers' practice of scheduled and preventive maintenance of wells and oil field equipment and lengthening operating periods between servicing shutdowns is now widespread. This practice also brings about a significant reduction in shutdowns due to equipment failure.

To make fuller use of oil field capacities during the 11-th Five-Year Plan, regionally differentiated, scientifically sound and technologically necessary allowances for well shutdown have been established. Repair and hire of submersible centrifugal pump units has been centralized in almost all production associations. A quality check of equipment arriving from manufacturing plants has been set up.

Mechanical engineers have prepared a number of new types of hardware, machinery and mechanisms for oilfield workers. A specific operation is carried out according to improvements in manufacturing quality of the oilfield equipment. This output of more reliable corrosion-resistant submersible electric motors and centrifugal pumps, sucker-rod pumps with one-piece cylinders, maintenance hardware for wells with 50-ton rated load capacity and other equipment has all been put into operation. This has made it possible to provide comparatively high well-operation figures and to increase the length of operating time between maintenace operations since the beginning of the five-year plan by almost 30 percent.

In the Yuganskneftegaz, Bashneft', Tatneft', Kuybyshevneft' and Udmurtneft' associations they have reduced equipment downtime to a minimum and have achieved comparatively long intersectorial between-servicing periods of well operation. By virtue of this, upcoming plans are fulfilled and socialist obligations met.

At the same time, wells are not being used effectively enough in a number of associations. This is one of the reasons for the sector's falling behind the scheduled assignments. Main reserves are met by speeding up the technical re-equipping of oil recovery equipment and improving well repair and maintenance.

HOW TO EXTEND THE INTER-SERVICE PERIOD

Every year hundreds of thousands of underground well repairs and tens of thousands of major well overhauls are done, costing around a half-billion rubles. Several tens of thousands of personnel take part in these operations. Yet the volume of repairs is falling far behind demand.

For example, in the Tatneft' and Kuybyshevneft' associations, only a little more than half of necessary major repairs are completed due to shortfalls of capacity. Even to bring about up-to-date conditions for increasing repair crew quality, as has been done, is impracticable because of labor reserve shortages in most oil-producing regions.

The basic solution to the problem is to extend the period of no breakdown time of oil field equipment, first of all that used in mechanized recovery. Analysis shows that more than 80 percent of underground repairs are on wells equipped with deep-well sucker-rod pumps. On the average, each of these pumps is repaired up to three times per year. There is an especially short inter-service period in regions where operations are carried out in hostile weather and sandy conditions. Unfortunately, Minkhimmash has been slow to solve the problems of increasing the reliability of deepwell pumps and increasing the output of sucker rods to replace its used-up reserve.

The volume, labor-intensiveness and time spent on well repair can be sharply curtailed by using hydraulic piston units for oil recovery. Their use in the oil fields of Azerbaijan, Tatar, Bashkir and Western Siberia attest to this. They are especially effective for deviating-hold and deep wells and they raise the technical level of recovery by virtue of their wide range of versatility in regulating the liquid supply. However, Minkhimmash has not begun production of these units to date. Manufacture of only a small unit series is projected before the end of the current five-year plan.

The oilfields are undergoing serious difficulties because of the absence of a number of submersible electric pump models, especially the high-lift, large capacity, rust-resistant variety. Meanwhile, the units have been built and tested. It's just that series production has not been set up. There is an analogous situation with electric diaphragm pumps which are much needed by Azerbaijan, Turkmen and Western Kazakhstan oil and gas production associations.

INTEGRATED MECHANIZATION RESERVES

Raising the labor productivity of the maintenance staff is a trend of no small importance toward improvement in the utilization of our oil-producing capabilities. Unfortunately, many well-repair units have no means for integrated mechanization of the most labor intensive lowering-into- and hoisting-out-of-hole operations. Production of snow- and swamp- vehicles or specialized machines for major well overhaul has not been organized.

A KORO-80 model unit, with a hoisting capacity of 80 tons, for example, was accepted by an interdepartmental commission as far back as 1973. Minkhimmash has been unable to set up its series production for over ten years. The development of equipment for transporting and injecting chemical reagents into strata, and well service equipment with 120-ton hoisting capacity, has been implemented slowly.

To start things off, a scale model of an automated well-service rig has been worked out and made by some oil workers. However, they are in no position to put it into production. It would be correct and in the best interests of the matter to use the model as a starting point and to set up production of the units at Minkhimmash plants.

In the maintenance staff's arsenal there is insufficient time for the simplest

adjustment of rotors and swivels for the mechanical wrenches, used to make up and break out pump and compressor tubing and rods. All this is significant if one considers the importance of the present stage of oil field repair and maintenance.

More than 250 standard sizes of basic oilfield equipment are used in oil production. However, part of them are not highly technical. We believe the problem is that scientific research and engineering development in this area are carried out by the uncoordinated forces of the ministries: the product manufacturers. In the system of the petroleum industry itself, small groups in certain sectorial institutes are occupied with a given problem. It is high time to create a special scientific and research, and planning and design section with a corresponding technical basis in oil recovery as is done, for example, in the drilling section. Duplication would be avoided by such a coordinated center and research operations would be carrid out more objectively and purposefully.

The time is ripe to establish a special science and research and design-engineering subdivision at Minnefteprom, with the appropriate technical support base to extract oil. This has already been done, for example, in the drilling area. Such a coordinating center could avoid duplications, and conduct reaearch operations in a more concise and goal-oriented fashion.

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CSO: 1822/318

OIL MINISTRY BODY STUDIES UNIQUE BAZHENOV SUITE

Searches, Decisions

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 6, Jun 84 p 23

[Editorial note: "The Bazhenov Suite: Searches and Decisions"]

[Text] From the editor. In December 1983 an out-of-town session of the Scientific and Technical Council of Minnefteprom [Ministry of Oil Industry] held at Nefteyugansk a discussion of the status of and routes for further developing research associated with exploitation of the Bazhenov suite of the Salym Field, in West Siberia. The oil deposit in this suite's sediments have attracted the specialists' attention for more than 10 years because of the unique properties of the reservoir, which have no counterparts in oilfield practice.

Questions of developing the Bazhenov suite have become of urgent importance, since it is widely spread within the West Siberian Region. In recent years, many scientific-research and production organizations, in studying the commercial petroliferousness of the suite and the possibility of recovering oil from it, have done work that is substantial in volume and fruitful in results, the outcome of which is set forth in reports to the out-of-town NTS [Scientific and Technical Council] session. Since these papers present definite scientific and practical interest, the editorial board of NEFTYANOYE KHOZYAYSTVO has found it expedient to publish in this issue a collection of articles that give reports presented at the session.

Commercial-Test Operating Results

UDC 622.276.5(47+57)

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 6, Jun 84 pp 23-26

[Article by O. A. Moskovtsev and V. I. Pogonishchev (Yugansknefteqaz [Yugansk Oil and Gas Production Association]): "The Results of Commercial Test Operation of Wells of the Bazhenov Suite of the Salym Field"]

[Text] The commercial petroliferousness of the Salym field is confined to bituminous clays of Jurassic age, which are deposited at depths of 2,800-2,900 meters and are 35-40 meters thick. The oil deposit is distinguished by anomalous formation pressure (up to 44 MPa) and temperature (130 degrees C).

More than 200 exploratory wells have been drilled at the field. As a result of tests of 141 wells, the following data about inflow have been obtained: in 28 wells (19.8 percent) the stratum was dry, 19 wells (13.5 percent) flowed at less than 1 m^3/day, 49 wells (34.7 percent) from 1 to 10 m^3/day, 24 wells (17.1 percent) from 10 to 30 m^3/day and 21 wells (14.9 percent) more than 30 m^3/day. Some wells (well 141, for example) flowed at 800 tons/day.

Drilling over of the test section, which was selected under the most favorable conditions in an area where high-output exploratory wells were located, showed that the initial flow rates of producing wells had approximately the same distribution as the flow rates of the exploratory wells, which cover a large area. Out of 72 wells drilled into the test section, 41 are being operated: 16 wells (39 percent) have a flow rate of less than 1 ton/day, 20 wells (48.8 percent) less than 10 tons/day, and 5 wells (12.2 percent) more than 10 tons/day. The highest flow rate (200 tons/day) was obtained at well 117.

Thus, the commercial petroliferousness of the Bazhenov suite at the Salym field has been proved, but a study of this field over a long time period has not provided an answer to all the unclear and difficult questions that touch on its geological structure, the oil's genesis, the nature of the thermobaric anomalies, the collector's characteristics, and, the main thing, the reserves, the recovery potential and methods for rational development.

Practically all the leading Minnefteprom [Ministry of Oil Industry] institutes are working on the solution of these questions under an approved, integrated program, "The Creation of a Theory of and a Technology for Developing the Oil Deposits of the Bazhenov Suite."

The Yuganskneftegaz Association is working on realization of the approved program. Because of the complexity of the geological structure and the lack of experience in developing a field of this type, it was decided initially to conduct a test operation of three exploratory wells. This was started in 1974, and in 1975 SibNIINP [Scientific-Research Institute for the Oil Industry] made up and approved for the Central Commission for Development, "Substantiation of Commercial Test Operation of the First Section," in accordance with which the drilling of production wells was undertaken in 1976.

It was planned to drill 50 oil wells at the test section in accordance with an approved grid. Drilling proceeded slowly prior to 1981--8,000-9,000 m/yr--because of the field's remoteness from the base that supplies materials and equipment, and the lack of roads. Later the drilling-over pace was increased to 25,000-30,000 m /yr.

At the end of 1983, 41 of the planned 50 wells had been completed by drilling. Another 24 above the approved 50 had been drilled, for studying the mutual effects of wells on separate sectors with a denser spacing: 500x500 and 250x250 meters. Moreover, a portion of the wells was drilled in order to realize a high-pressure gas injection design that SibNIINP made up in 1981. The design called for the use of retrograde condensation, that is, dissolving oil in dry gas (a cycling process), which proved during laboratory research the possibility of increasing the productivity of Bazhenov collectors by 10-12 percent.

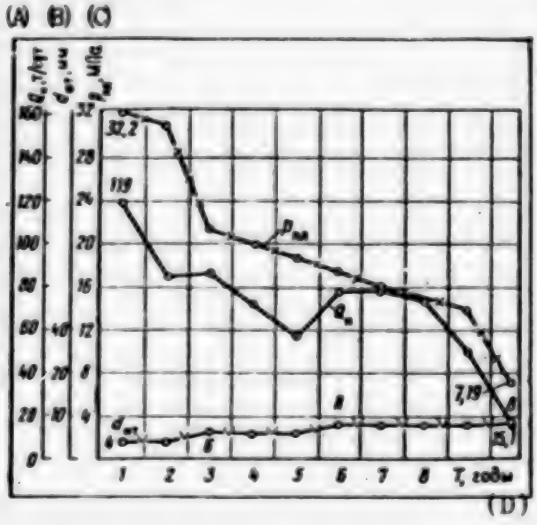
However, under the field's actual conditions, the cycling process is possible after the substantial reduction in formation pressure that is expected about 1988-1989. Moreover, realization of the design does not allow a high rate of recovery of the crude to be obtained, since gas injection and recovery should be alternated, with a period of 3-6 months per year. It was recommended that the process be accomplished on the basis of six five-point elements, which include 6 gas-injection holes and 30 producing wells.

Thus, counting the drilling of the additional wells for the operating inventory, there are 47 producing wells and 12 exploratory wells on RSFSR Mingeo's [Ministry of Geology] books.

During 1983 oil recovery at the field was 191,000 tons, or an average of 523 tons/day. During the whole period of trial operation, 1.4 million tons of oil were recovered, 72 percent of it by exploratory wells, 28 percent by the designed wells of the experimental section. It was established that the flow rates of the crude $Q_н$ and the formation pressures $p_{пл}$ are sharply reduced during the initial period of operation. Figure 1 shows the dynamics of $Q_н$ and $p_{пл}$ for one of the wells that has been operating for a lengthy period--exploratory well 28, which, at the end of 1983, had ceased to flow because of a substantial reduction in formation pressure (by 35 MPa). The cumulative withdrawal for well 28 was 202,000 tons, which is much more than for other wells.

Figure 1. Dynamics of the Recovery of Crude $Q_н$ and or Formation Pressure $p_{пл}$ for Well 28 ($d_{шт}$ Is the Flow-Bean Diameter).

A. Tons/day.
B. Flow-bean diameter, mm.
C. Formation pressure, MPa.
D. Years.



One of the main problems throughout the whole test operation was an intensification of operation of low flow-rate wells, which comprised 70.7 percent of the sector (29 wells).

The large inventory of low flow-rate wells is one of the main constraints in solving the problems of drilling the deposit over further. Initially it was considered that a large number of constraints were imposed by poor quality of the drilling-in of the producing formation, sc experiments were conducted with the various drilling muds that are being used for initial drilling-in. Twenty-seven wells were drilled in with flushing with clayey mud weighted with barite, 7 with an oil emulsion (IER [lime-emulsion mud] and TIER [weighted

lime-emulsion mud]), and 17 by a chalky mud. It was established that the average flow rate for wells that were drilled into the Bazhenov sediments with the use of clayey, IER and chalky muds were, respectively, 10.3, 19.6 and 27.6 tons per day. Taking this into account, drilling was converted completely to flushing with chalky muds. However, the number of low flow-rate wells did not drop. The cause, apparently, was the reservoir's complicated geological structure.

With a view to intensifying the inflow, 17 acid treatments of the bottom-hole zone of the wells were conducted in various modifications. Inflow increased only for wells Nos 121 and 558. Treatments of the bottom-hole zone with methanol also yielded no positive results. Two hydraulic fracturings were conducted, during which it was managed to inject 3-5 tons of sand into the formation at a pressure of 45-50 MPa. Since the existing equipment does not withstand such wellhead pressure at well depths down to 3,000 meters, it was decided to drill special wells for concentrated hydraulic fracturing at a pressure of 70 MPa.

For purposes of operating low flow-rate wells, a large amount of work was done on converting them to artificial lift. In all, 19 wells were equipped with sucker-rod pumps (SShN's) in 1983. However, their operating indicators for 1983 were low. All the wells worked in a periodic mode with an accumulation period of 2-17 days or more and a flow rate of 1.5-2 tons/day. An economic assessment of the effectiveness of artificial lift that was performed on the basis of SibNIINP methodology showed that the prime costs for recovering crude from wells equipped with SShN's greatly exceeded the general prime cost. Such operation was undesirable, since it did not warrant even the power consumed for lifting the output.

During the trial operation and drilling of wells, much attention was devoted to hydrodynamic and geophysical research for studying the deposit's working system in time, determining the mutual effects of the wells, making a detailed breakdown of the cross-section, and singling out the working intervals, and a major complex of operations was performed.

The results of geophysical research in the Bazhenov suite cross-section will enable six basic members (C_1, P_1, C_2, P_2, C_3 and P_3), which consist of various types of clays and carbonate rocks, to be singled out within the Salym field (figure 2).

Interesting results were obtained in 1982-1983 from a study of 24 wells (61.5 percent of the inventory) with downhole flowmeters. Analysis of the results enabled the presence of several oil inflow zones to be established. In the upper part of the cross-section, which corresponds to member C_1 and, partially, member P_1, a zone of very weak inflows or a complete absence thereof was observed. Members C_2 and P_2, which are located in the middle part of the suite, are marked mainly by average flow rates (up to 10-15 tons/day). Higher flow rates were obtained from the lower portion of member P_3, and also beyond the Bazhenov suite--from clay sediments of the Abalak suite. In some wells, during shutdown, crossflows are recorded in Bazhenov sediments, into the lower part of them (see figure 2б), which indicates a different degree of coverage of the development object and a difference in formation pressure. The instruments also record inflows directly from the well's bottom-hole, if the bore is padded with rock.

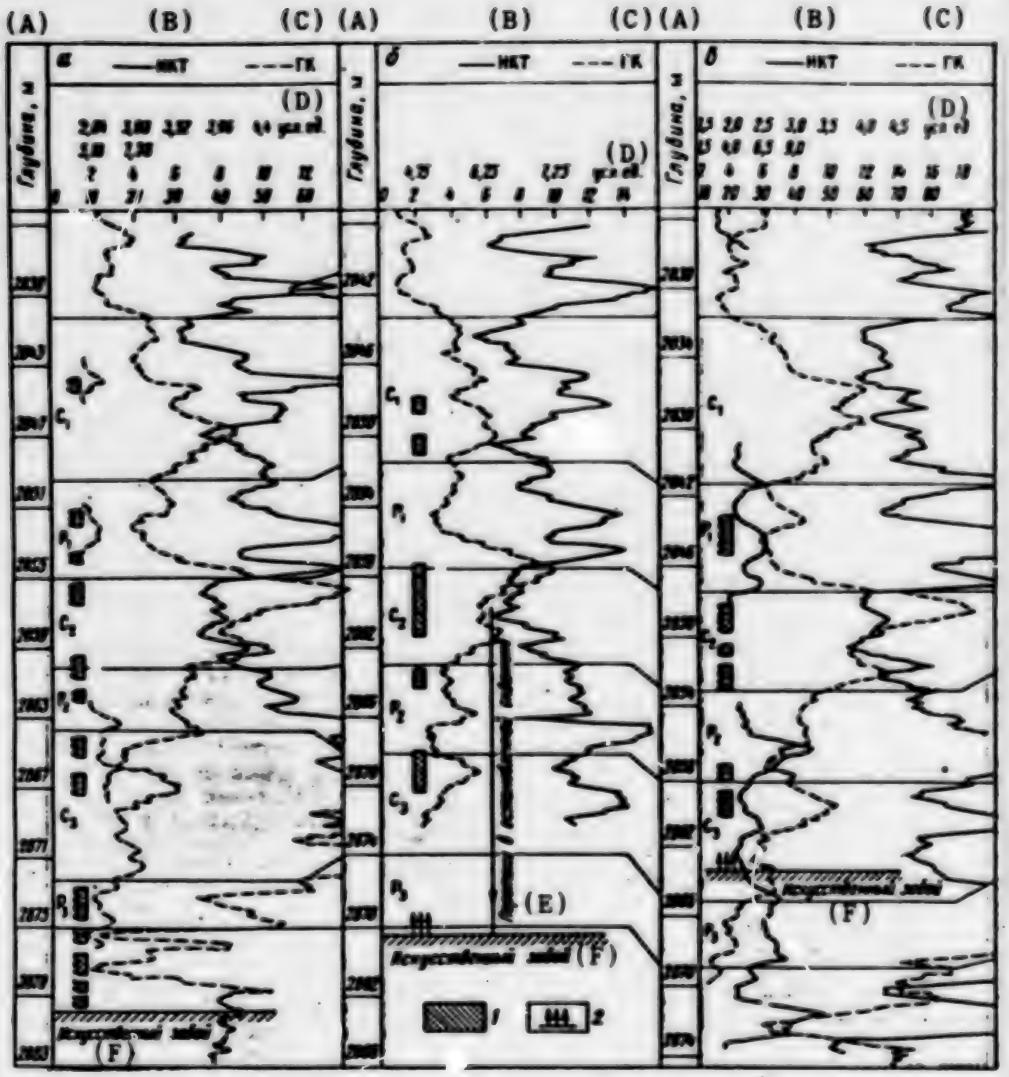


Figure 2. The Results of Oilfield Research in Salym Field Wells.

а. Well 123, oil flow rate $Q_н$ = 45 tons/day.
б. Well 128, $Q_н$ = 7 tons/day, and the well is operating in an accumulation mode.
в. Well 121, $Q_н$ = 110 tons/day.

1. Inflow zone.
2. Main oil inflows.

A. Depth, meters.
B. Tubing.
C. Gamma-ray logging.
D. Arbitrary units.
E. Crossflows in a shut-in well.
F. Artificial bottom-hole.

Thus, there is every reason to presume that oil inflows are confined mainly to the footwall of the Bazhenov suite or to the upper parts of the Abalak suite, which contains thin formations, which are called correlating strata (KS's). Their unified indexation in the cross-section still has not been worked out. Singling them out in the cross-section according to the geophysical data is not always accurate.

For a long time the correlation strata could not be described even by coring, although the cores were taken from nine wells. For some wells, core recovery was less than 80.7 percent. At the start of 1984, coring was taken from well 554, where it was managed to raise samples from two correlation-strata intercalations at the footwall of the Bazhenov suite. In all, 2.8 meters of coring were taken, which were indexed as an intercalation of the correlation strata.

On visual inspection, this was very broken-up clayey rock that alternated with various monolithic lumps of bituminous clays, which had large openings. Such rock, in our opinion, can be described as of high permeability, but, because of the slight thickness, it did not have large capacity. Because of this, the recoverable reserves at the test section can prove to be lower by one order than had been thought. These conclusions are confirmed also by computations according to the material-balance method, with the use of the results of experimental operation of the sector.

Data from experimental injection of water into well 558 at a pressure of 15.3-15.8 MPa with an injectivity of 570-600 m³/day will serve as direct confirmation of the high permeability and small capacity of the correlation strata. In all, 23,500 m³ were injected. In neighboring well 557, the injected water appeared after 15 days, where the distance between bottom holes was 306 meters. According to the results of hydrophone listening, the signal between wells 558 and 557 occurred for 15 minutes.

Thus, high flow-rate oil inflows were obtained in some Salym-field wells, mainly as a result of the presence in the cross-section of highly permeable collectors of small thickness. For purposes of a final quantitative description of the recoverable reserves, the question of the hydrodynamic tie of the correlation strata and the main clayey mass (or matrix) must be solved. In order to find the mechanism of the interaction of the correlation strata and the matrix at the experimental sector, it is planned to drill two clusters of wells with separate drilling-in and subsequent study of their hydrodynamic tie. Moreover, in 1984, it is proposed to drill horizontal wells with penetration of the horizontal portion of the bore along the Bazhenov suite for a distance of 350-400 meters, and also to solve problems connected with a more detailed taking of cores, with study of the effects of solvents, and so on.

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Statistical Reserve-Estimating Method

UDC 553.98.048

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 6, Jun 84 pp 26-29

[Article by E. M. Khalimov (VNII [All-Union Oil and Gas Scientific-Research Institute]): "Methods for Estimating Bazhenov Suite Oil Reserves"]

[Text] The urgency of the problem of assessing the oil reserves in sediments of the Salym field's Bazhenov suite is occasioned by the wide distribution of these deposits within the West Siberian platform, and by oil shows and oil inflows from them in many areas [1 and 2]. The Salym area is the most

studied. Here, more than 240 exploratory and recovery wells, some of which underwent trial operation for 10 years, have been drilled into the Bazhenov suite.

Despite the large amount of field geological information and numerous studies, there is still no generally accepted notion about a model for the formation or an agreed approach to the choice of methods for estimating the oil reserves. Meanwhile, a reliable estimate of Salym-field oil reserves would enable the resource of the Bazhenov suite as a whole to be assessed more reliably.

The first attempts to determine the reserves were based upon the use of a modification of the volumetric method (1977). However, they were recognized as unsuccessful because of the lack of substantiated basic data for evaluating the oil-saturated thickness and capacity of the collector. Also, the methods based upon use of the material-balance equation proved to be unacceptable, because of the lack of reliable determination of the compressibility coefficient of the medium and the formation pressure throughout the deposit. Attempts were undertaken to create a unique model of the sediments' geological structure and work out corresponding methodics for estimating the reserves. Meanwhile, when using any new methodology, the requirements for substantiating its basic principles and the initial data grow and, accordingly, the possibility of using functions that are known for existing concepts is limited.

For the substantiated selection of a method for assessing the Bazhenov sediments' oil reserves, BNII did a comparison study of the traditional methods of estimation and of new methodologies proposed by ZapSibNIGNI [West Siberian Scientific-Research Institute for Geological Exploration for the Oil Industry], SibNIINP [Siberian Scientific-Research for the Oil Industry], MINKh i GP [Moscow Institute of the Petrochemical and Gas Industry imeni Akademik I. M. Gubkin], VNII and other institutes. It was established, as a result, that the most valid method for the conditions of the Salym field's Bazhenov suite was the well-known statistical method, which is founded on use of the data of well operation [3].

Use of this method was substantiated by the following factors:

representativeness of statistical sample, which was provided by the large number of wells drilled in (240) and of wells formerly in operation (50 percent); the existence of wells from which a substantial amount of oil had been recovered in 10 years;

nonwater drive for developing the deposit, during which oil recovery for each well and recovery as a whole changes smoothly and can be described accurately enough mathematically, with a forecast for the future; and

the precision of measurement of current oil flow rates and of formation and bottom-hole pressures during the trial operation.

Zones of commercial petroliferousness that are marked by increased fracturing of the rocks have been established for the Salym field's Bazhenov sediments. Anomalously high initial formation pressures and increased temperature

correspond to them. In some sectors, possibly, the zones along the fractures have a connection with the underlying strata of the Abalak suite. The oil reserves in the zones where "dry" wells are located, where the starting inflow is less than 1 ton/day of oil, must be categorized as uneconomical reserves.

Based upon the set of oilfield geology data and measurements of the initial flow rates of the wells and the formation pressure for the field's area, an area for estimation of reserves should be singled out. The inclusion therein of zones with initial oil inflows of at least 5 tons/day from the wells can be considered sound.

As a rule, the area of estimation of reserves is unevenly embraced by the wells drilled in and wells formerly in operation, so the result of the estimate for the commercial test operation sector will be more authentic. This sector can be considered a standard one (see the figure). It encompasses 35 producing wells, 15 of which have been operating for a fairly long time. Two zones are singled out at the standard sector: the northern, which has been almost completely drilled over with wells, in accordance with a designed pattern, and the southern, which has been drilled over partially. The zones also differ in degree to which they have been worked and in current formation pressure.

The traditional statistical method is used for estimating oil reserves in formations under the prevailing development system. In this case the area is not completely covered by the system of wells. Therefore, aside from the estimation of reserves in the area embraced by the system of wells, the task arises of evaluating reserves at sectors at which drilling is proposed.

First the reserves at the standard sector are estimated. For this purpose, a curve of cumulative oil recovery $Q_н$ is constructed as a function of reservoir pressure $p_{пл}$ and is extrapolated to the maximum possible level of reduction of $p_{пл}$. For the critical value of $p_{пл}$ up to which the cumulative recovery of crude through an elastic operation can be estimated, 0.75 of the saturation pressure $p_{нас}$, or a reduction in the level in the well up to a depth of 1,000 meters from the wellhead that corresponds to it, should be adopted. Below this value, the nature of the curve $\Sigma Q_н = f(p_{пл})$ varies because of conversion of the wells to dissolved-gas drive.

The limiting bottom-hole pressure, below which well operation by artificial lift is impossible, is 7-8 MPa, and in this case $p_{пл}$ is equal to about 10-14 MPa, so the possibility of recovering crude under a dissolved-gas drive is very limited.

Thus, at the given stage of development, reserves should be evaluated on the basis of an elastic drive with partial development of the dissolved-gas drive, from $p_{нас}$ to 0.75 $p_{нас}$ ($p_{нас}$ = 16.6 MPa). An analysis of the operation of recovery wells has indicated that, in accordance with the nature of $\Sigma Q_н$ as a function of $P_{пл}$ and of the flow rates, three groups of wells can be singled out provisionally. An extrapolation of $\Sigma Q_н = f(P_{пл})$ curves to the level of 0.75 $P_{нас}$ gives for each well a forecast assessment of recovery. The results of this evaluation are shown in the table.

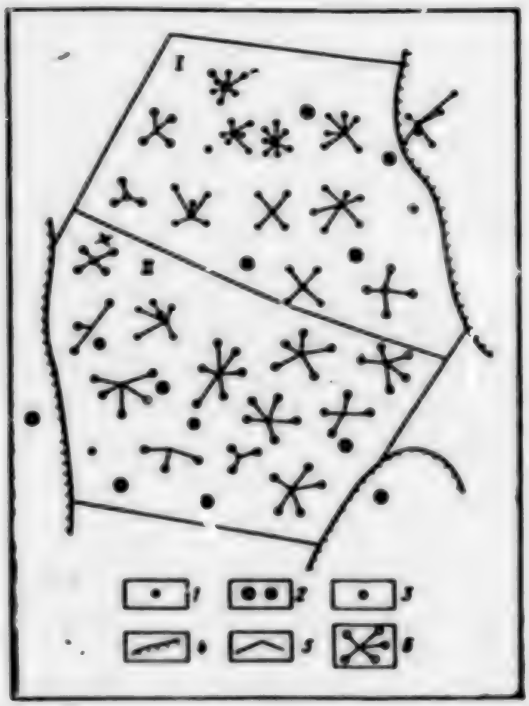
Diagram of a Standard Section of the Salym Field.

I and II are, respectively, the northern and southern zones.

1, 2 and 3 are, respectively, production wells and drilled-in exploratory and designed wells.

4 and 5 are the boundaries, respectively, of the productive zones and the estimating sector.

6 is a well cluster.



Group of wells, by productivity	Well category*	Northern part of the sector: Number of wells	Northern part of the sector: Initial $p_{вз}$ of the average well, MPa	Northern part of the sector: Forecast of $\Sigma Q_н$, thousands of tons	Southern part of the sector: Number of wells	Southern part of the sector: Initial $p_{вз}$ of the average well, MPa	Southern part of the sector: Forecast of $\Sigma Q_н$, thousands of tons
I	1	2	42	600	1	42	180
	2	4	23	640** / 320-1000	5	30	1075** / 680-1530
Total.....		6		1240** / 920-1600	6		1255** / 860-1710
II	1	4	33	280	1	41	85
	2	16	23	816** / 416-1216	18	30	1188** / 738-1638
Total.....		20		1096** / 696-1496	19		1273** / 823-1723
III	1	7	31	115	-	-	-
	2	33	23	231** / 33-693	41	30	656** / 410-1230
Total.....		40		346** / 148-808	41		656** / 410-1230
Total for parts of the sector		66		2682** / 1764-3904	66		3184** / 2093-4663

*Categories 1 and 2 are "old" and planned wells, respectively.
**The numerator is the average forecast $\Sigma Q_н$, in the denominator are its minimal and maximal values.

Determination of the possible recovery of crude from designed wells, as well as drilled-in wells, but also from wells not being operated, consists of: substantiation of the designed pattern of production wells, establishment of the shared participation of wells of various degrees of productiveness, establishment of the shared participation of wells of various degrees of productiveness in the working of reserves and of the operational characteristics; and computation of possible recovery from designed wells.

A uniform square grid with a 1,000-meter distance between wells was substantiated, and cluster drilling was used. The actual average density of the well grid in the drilled-over zone was 80 hectares per well.

The forecast recovery of crude from the designed wells was determined, with the assumption that the producing wells' operating characteristics have been established and distribution of initial flow rates apply also to sectors not yet drilled over. The results of the grouping of wells was used. Three groups were singled out in accordance with the cumulative-recovery data, current formation pressure, and initial and current flow rates.

Group I's share in the total number of wells is 0.09, group II's is 0.29 and group III's is 0.62. This ratio was adopted for all sectors for estimation. Using the average forecast recovery for each group of wells (see the table), the reserves in the areas of the sector that have not been drilled over can be estimated. In evaluating the oil reserves, it was considered that new wells in various parts of the standard section will enter into development at different initial reservoir pressures. The error in evaluation obtained by the "boundary-samples" method corresponds to a confidence probability of 0.9.

The forecast cumulative recovery of crude cited in the table is determined for the existing network of wells. It can be increased when the network density is increased, and an evaluation of the growth potential has been made.

It was established that the deposit in the rocks of the Bazhenov suite is a single hydrodynamically connected system that operates on an elastic mode. This is confirmed by research performed by VNII staff workers under I. D. Umrikhim's supervision.

In productivity, most of the wells studied belong to group I. The research results indicate that in zones where group I wells are located, it is not desirable to drill more wells, since they will take crude from drilled-in wells, crude whose recovery has already been counted in evaluating reserves.

For wells of group II, it can be assumed that about half of them interact.

Group III wells (low flow-rate) do not interact, so, by doubling their number, additional recovery (an estimated 7,000 tons for each well) can be obtained. Thus, as a result of infilling of the grid 2-fold, recovery at the standard sector is increased by 29 percent.

In order to estimate oil reserves for the whole area, the share of oil reserves per hectare of area is determined from the standard section. Then this is extended to the other sectors of the area, with the introduction of a

correction factor. These factors are found by dividing the average productivity factor, which is computed for exploratory and production wells for each sector, by the average productivity factor of the standard sector. The oil reserves for each sector of the computation is obtained after multiplying the specific reserves by the area of the sector and the correction factor.

In considering the differences in degree of substantiation of the initial data and the authenticity of the computed reserves, the following approach to establishing categories of reserves can be recommended. At the sector that was drilled over in accordance with the pattern adopted for production wells, the recoverable reserves correspond to category B. At the remaining area of the sector with commercial productiveness, the reserves that are computed for a well grid of the same density should be assigned to category C_1. Reserves that can be obtained where there has been an infilling of the well pattern can be classified only as category C_2, since they have been evaluated under certain assumptions.

Thus, the well-logging data accumulated at this stage of trial operation of the Salym field will enable the actual recoverable oil reserves of the Bazhenov suite to be evaluated with a validity adequate for generally accepted practice, by using the statistical method of estimating. If scientists continue to discuss the type of collector in the Bazhenov suite, it is important to emphasize still another advantage of the statistical method: it is acceptable for any hypothesis as to type of collector, since the estimate includes all the oil recovered from wells embraced by the sector's area, and the whole amount opened up, regardless of which portion of the cross-section to which the inflow interval is confined. Moreover, the computations employ all the available oilfield information.

BIBLIOGRAPHY

1. Geologiya nefti i gaza Zapadnoy Sibiri [The Oil and Gas Geology of West Siberia]/A. E. Kontorovich, I. I. Nesterov, F. F. Salmanov, et al. Moscow, Nedra, 1975.

2. Khalimov, E. M. and Melik-Pashayev, V. S. "Prospecting for Commercial Accumulations of Oil in the Bazhenov Suite," GEOLOGIYA NEFTI I GAZA [The Geology of Oil and Gas], No 6, 1980, pp 1-10.

3. Zhdanov, M. A. Neftepromyslovaya geologiya i podschet zapasov nefti i gaza [Oilfield Geology and the Estimating of Oil and Gas Reserves]. Moscow, Nedra, 1981.

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Volumetric Estimation of Reserves

UDC 553.98.048

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 6, Jun 84 pp 29-33

[Article by Ye. P. Yefremov, V. P. Sonich and V. M. Il'in (SibNIINP [Siberian Scientific-Research Institute for the Oil Industry]): "Peculiarities in Estimating Oil Reserves"]

[Text] Evaluating the recoverable oil reserves of the Yu, formation of the Salym field's Bazhenov suite is an extremely difficult task, the solution of which has occupied many scientific and production organizations for more than 10 years. This is occasioned by the fact that the productive deposits are clayey rocks, which ordinarily are considered screens. There are no examples of experience in estimating oil reserves in such rocks, not only in the USSR but in the whole world.

Much oilfield and laboratory research has been done in recent years that permits most of the basic parameters estimated by the volumetric method to be substantiated reliably. At the same time, based upon the results of lengthy test operation, the possibility has appeared of developing new modifications of the method for estimating reserves which do not use parameters that are difficult to substantiate, such as the formation productivity coefficient, the effective volume and thickness, formation compressibility, and so on.

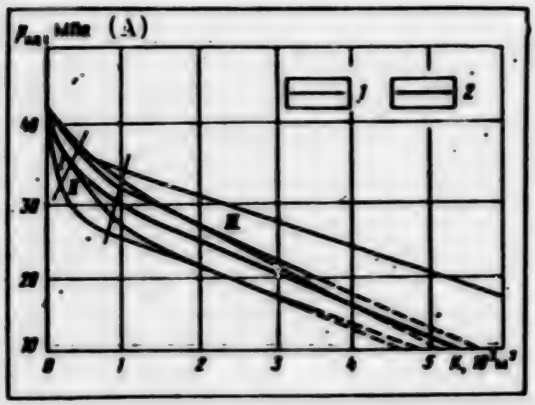
Test operation of the Yu, formation began at Salym field in 1974 and about 1.5 million tons of crude had been taken from the deposit by 1 January 1984. As a result of the trial operation and oilfield and laboratory research, it was found that the types of collector are fractured and porous, and sometimes cavernous-fractured and porous. The distribution of the collectors about the field is lenslike in nature. The length of the lenses varies from several meters to several kilometers, and basically there is a weak hydrodynamic tie among them, which is manifested only during lengthy operation. Along the vertical, the hydrodynamic tie among the various lenses is weaker because of low permeability k in the direction perpendicular to the bedding ($k < 10^{-3}\mu^2$), and very often individual lenses are joined only by means of the wells.

Moving water was not observed in even one well. The production mechanism for the lenslike collector is elastoplastic and quasiclosed. Relatively high flow-rate wells, in the absence of mutual effects over a lengthy period, flow through the formation's elastic energy. In so doing, the formation pressure is reduced, sharply at first and then gradually to a constant level (figure 1). An analysis of the functions discovered indicates that the formation's development includes three stages.

During the first stage of development, the crude is recovered basically through formation compressibility of the fracture system. In the second stage, the rate of reduction of formation pressure is greatly lessened with cumulative withdrawal and is determined by the inflow of crude both from the fracture system and from the matrix's connecting pores. At the third stage the main volume of the crude arrives from the matrix's pores, while the

Figure 1. Reservoir Pressure $p_{пл}$ as a Function of the Withdrawal of Crude K:

I, II and III. Stages of development.
1. By separate well.
2. Average statistical.
A. $P_{пл}$, MPa.



fractures perform mainly the function of conducting the oil to the well. The ratio of the averaged weighted values of oil recovery during reduction of formation pressure by 1 MPa for each stage of development is 1:4.7:8.2.

The volumetric method for estimating oil reserves has a large number of versions and it is used widely with any production mechanism of an oil-and-gas formation. The geological $V_г$ and the recoverable $V_п$ reserves of oil in locked deposits in fractured-porous or cavernous-fractured-porous collectors that are being exploited on the basis of a depletion mode can be computed in accordance with the the formulas

$$V_г = Sh(\kappa_н + \kappa_п + \kappa_т)\rho/b; \quad (1)$$

$$V_п = Sh(\Delta p\beta^* + \kappa_т \Delta p' \beta_т \alpha_т)\rho/b, \quad (2)$$

where S is the area of the deposit; h is the effective thickness, $k_н$, $k_п$ and $k_т$ are the coefficients, respectively, of oil saturation, porosity and fissuration; ρ is the crude's density; b is the shrinkage coefficient; Δp and $\Delta p'$ are the differences, respectively, of the initial and final formation pressures, and the initial formation pressure and the pressure of saturation; β^* is the coefficient of the formation's elastic compressibility; $\beta_т$ is the coefficient of compressibility of the fractures; and $\alpha_т$ is the coefficient of formation productivity, caused by the fractured state of the formation, based upon a dissolved-gas drive. The deposit's boundaries are singled out in accordance with the results of drilling and test of exploratory wells, the optimal distance between which is 5-7 km. The extent to which the Yu_0 formation of the Salym field has been drilled over and the volume of tests of its wells are adequate for correctly singling out zones with economically profitable flow rates of the wells.

In substantiating the formation's effective capacity, the influence on formation productiveness of massive rocks that are found within the productive fractured intervals and the surrounding intervals must be evaluated during development. Tests conducted showed that the permeability of the massive rocks for oil in the direction parallel to the bedding is 10^{-8} to $10^{-9}\mu^2$, and the bedding varies perpendicularly from 10^{-9} to $10^{-11}\mu^2$. The composition of the hydrocarbons that fill the pore space of the massive rocks is close to the composition of the oil being recovered. It was found that the hydrocarbons in the pore space of the Bazhenov-suite rocks are in a single-phase state even at a pore pressure of less than 10 MPa.

Given these collector properties of the rocks, during the entire time of development (more than 10 years), the thickness of the included nonfissured differences along the vertical does not exceed 10-15 cm, while along the horizontal it is several meters where there are vertical or sloped fractures.

At the modern level of development of equipment for oilfield studies of wells, it is recommended that effective capacity be evaluated by means of measurement of the thermal flow rate. Yuganskneftegeofizika [Yugansk Oil and Gas Geology Trust] studied 21 wells, or about 60 percent of the operational inventory, by this method at the commercial test sector of the Salym field. The absence of a tie of the effective capacity with the initial flow rates of the wells was established.

It is proposed that the formation's compressibility factor be computed according to the formula

$$\beta^* = \kappa_{ox}(\kappa_н\kappa_т\beta_н + \kappa_т\beta_т + \kappa_в\kappa_н\beta_в + \kappa_в\kappa_н\beta_в + \kappa_н\beta_н). \quad (3)$$

where k_{ox} is the coefficient of the coverage of development; $\beta_н$, $\beta_в$ and $\beta_п$ are the coefficients, respectively, of oil, water and the pores; and $k_в$ is the coefficient of water saturation.

Reference data is usually used to substantiate $\beta_в$, according to which it varies from $4.6\cdot10^{-4}$ to $7.6\cdot10^{-4}$ $МР^{-1}$ at a temperature of 100-150 degrees C; $\beta_н$ is determined in the laboratory; and $\beta_п$ of the Bazhenov suite rocks must be computed for two stages of development: under elastic and elastoplastic drives. For the first stage, according to laboratory data, $\beta_п$ averages $1.5\cdot10^{-3}$ $МРа^{-1}$. For the second stage its maximum possible value, according to the dependence of the overall porosity of Bazhenov-suite rocks and its analogs upon the depth of deposition, is much higher. Preliminary research and computations indicated that the reduction in intergranular porosity during the deposit-development period, given a reduction in pore pressure in the fractures of less than 10 MPa, does not exceed 20 percent of its initial value.

The coefficient $\beta_т$ of Bazhenov-suite rocks is determined by three methods: according to the results of core analysis, data from study of the oil permeability of fractured coring at various compression pressures, and the results of study of productive wells under various operating modes, using the formula

$$\beta_т = \frac{\sqrt[3]{k} - \sqrt[3]{k_1}}{\sqrt[3]{k_1\,\Delta p_{заб}}} \text{ or } \beta_т = \frac{\sqrt[3]{\eta} - \sqrt[3]{\eta_1}}{\sqrt[3]{\Delta p_{заб}}}, \quad (4)$$

where k and k_1 are coefficients of permeability of the samples under two neighboring compression pressures; $p_{заб}$ is the difference in compression pressure or of bottom-hole pressures; and η and η_1 are coefficients of productivity of the wells for various well-production mechanisms.

An analysis of $\beta_т$ obtained with formula (4) indicated that, with the submergence of rocks, it rises to $(4\text{-}4.5)\cdot10^{-2}МРа^{-1}$. This, apparently, is occasioned by an incorrect reflection of the process of fracture deformation by the formulas proposed by F. I. Kotyakhov. If $\beta_т$ is varied in similar fashion, then the submergence of the rock, with an additional pressure of 30-40 MPa,

would cause a complete "healing" of the fractures. In connection with what has been said, it is proposed to determine β_T on the basis of a fractured core. The research that was performed indicated that β_T varies insignificantly during the submergence process (figure 2).

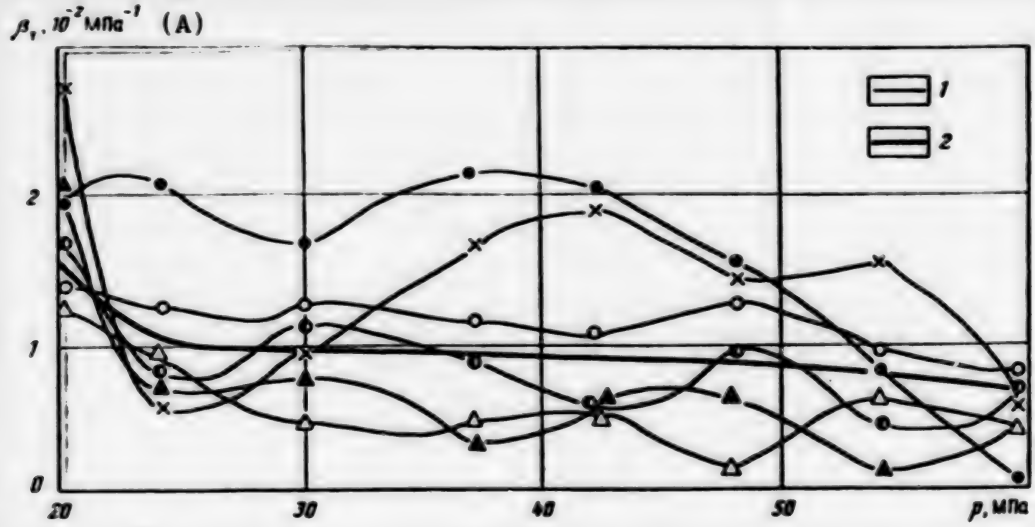


Figure 2. The Compressibility Coefficient β_T of Bazhenov-Suite Rocks as a Function of Confining Pressure p:

1. For individual core samples.
2. The statistical average.

A. MPa^{-1}.

The coefficient k_H is found by a direct method, by coring. Based upon the results of this research and electrical well-logging data, the apparent specific resistance as a function of rock moisture was obtained.

The porosity of blocks of rock of the Bazhenov suite is obtained by a core which basically is not a collector but is located in an effective oil-saturated portion of the formation. It is proposed to determine the overall porosity of the rocks of the effective portion of the formation according to GGK [gamma-gamma logging] with use of the dependence of the specific density of the shell of the rock on the interval of deposition (figure 3). The primary interpretation of GGK data indicated that the overall porosity is about 10 percent and differs substantially from the average for coring.

A more reliable method for determining the k_T of the suite's rocks is the two-solutions method, by which nine well cross-sections at the Salym field have been studied. It was established that the fractured (effective) porosity in the recovery intervals does not exceed 0.5 percent, while the average for the well is 0.1 percent.

The density and shrinkage coefficient of the formation's oil is studied in the laboratory. No special difficulties arise in substantiating it.

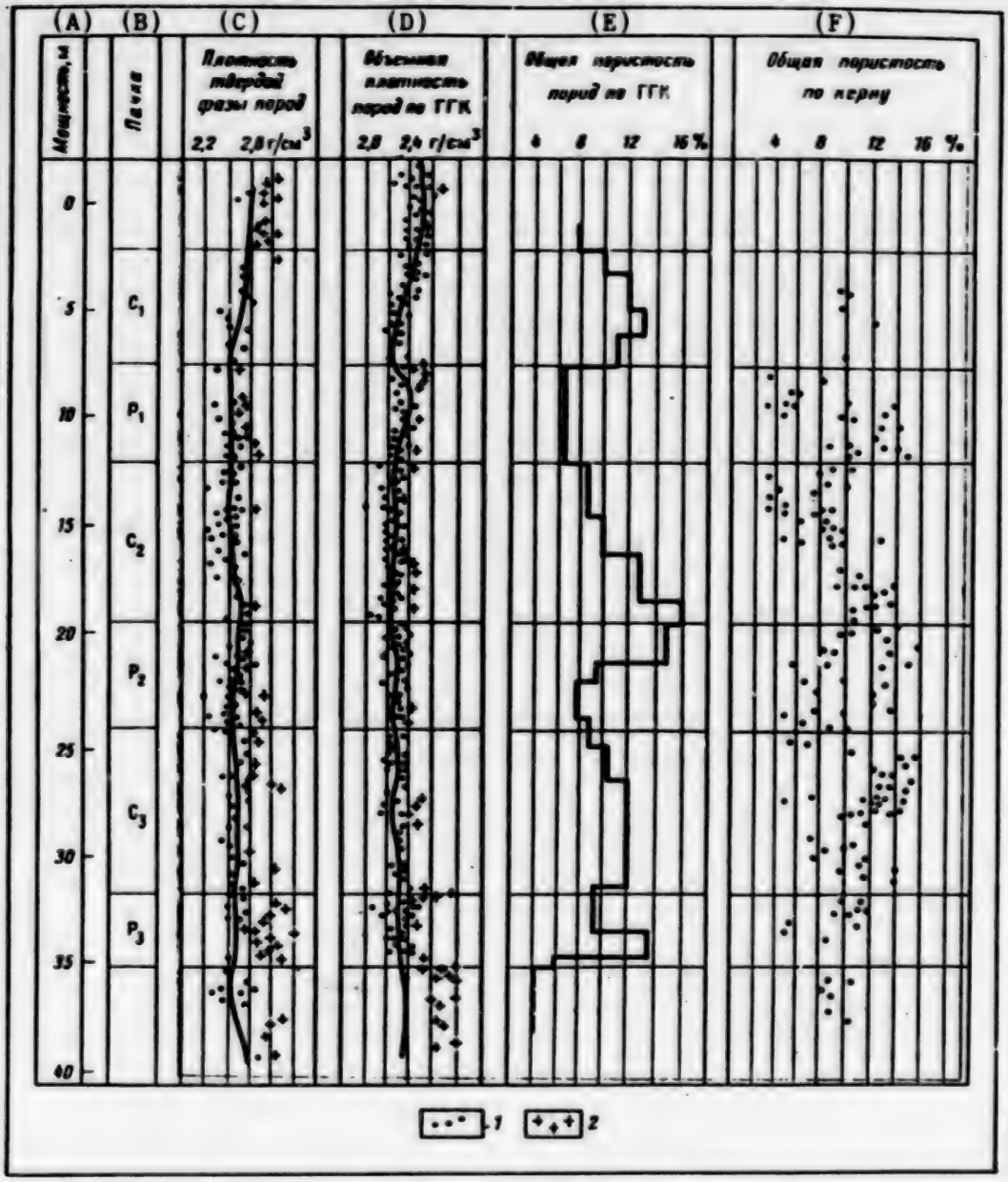


Figure 3. Change of Capacity and Density of the Rocks of the Salym Field's Bazhenov Suite.

1 and 2 are, respectively, low carbonate-content rocks and essentially carbonaceous rocks.

A. Thickness, meters.
B. Member.
C. Density of the solid-rock phase.
D. Volumetric density of the rocks, according to GGK [gamma-gamma logging].
E. Overall porosity of the rocks, according to GGK.
F. Overall density of the rocks, according to coring.

In order to evaluate k_{ox} it must be considered that the permeable objects are of lenslike shape, the area of a lens varying from several square meters to several square kilometers. "Dry" holes are possible in zones of high and medium productivity. The number of permeable intercalations in the formation's cross-section in a drilled-in well, according to the notion of various researchers, varies from 2-3 to 10-15. Uniquely large lenses of the collector include detritus and rocks differing from each other by a permeability of 10^{-3} to 10^{-2} μ^2.

Taking into account what has been noted and experience in developing the deposits, even with substantially lower coefficients of inhomogeneity and ruggedness, and given the existing well-grid density, the k_{ox} of fractures can be evaluated in preliminary fashion by the ratio of the specific oil reserves of a thoroughly studied commercial-test section, which is obtained by two methods: the volumetric and the elastic material balance.

At a later stage of development, when the pressure in the formation will be reduced to the pressure of saturation, a dissolved-gas drive will start to appear, along with the elastic drive. Laboratory research has shown that the former exists only in fractures and at formation pressures that are 25-30 percent lower than the saturation pressure.

Based upon the practice of developing oil deposits based upon a dissolved-gas drive, and also upon the results of preliminary studies conducted by the authors, the α_r, which is occasioned by fissuration of the Bazhen-suite rocks, will, at the given drive, vary from 0.2 to 0.4.

Because of the inadequate degree of substantiation of $\beta_п$ under an elastoplastic deformation drive, and also because of the absence of reliable factors for substantiating k_{ox}, it is proposed to estimate the oil reserves by the pressure drop. In this variant, the formation's basic parameters, which are necessary when computing by the volumetric method, are not used.

As a result of the test operation at the commercial-test sector, the possibility of constructing an isobar map had already appeared by 1 July 1981. In the ensuing years, a slow expansion of the area covered by development of the formation was observed.

The existence of the dependence of the drop in formation pressure $p_{пл}$ on the relative cumulative withdrawal of oil K (see figure 1), the elastoplastic drive for developing the deposit and the isobar maps will permit specific recoverable oil reserves to be estimated according to the formula

$$V = \frac{Q\,(c_1\,\Delta p_1 + c_2\,\Delta p_2 + c_3\,\Delta p_{3\text{тек}} + c_3\,\Delta p_{3\text{ост}})}{c_1\,\Delta p_1 S_1 + c_2\,\Delta p_2 S_2 + c_3\,\Delta p_{3\text{тек}} S_{3\text{тек}}}, \qquad (5)$$

where Q is the cumulative amount of oil recovered from the whole area of the commercial-test sector on the date the isobar map was compiled; c_1, c_2 and c_3 are coefficients of the ratio of the amounts of withdrawal of oil during a reduction in formation pressure of 1 MPa for each stage of development; Δp_1 and Δp_2 are changes in formation pressure for, respectively, the first and second development stages that were singled out; $\Delta p_{3\,Tek}$ is the current drop

in formation pressure during the third stage of development on the date the isobar map was constructed; $\Delta p_{3\ ост}$ is the remaining (final) drop in formation pressure, that is, the difference between the current formation pressure at the third stage of development and the minimal formation pressure; S_1 and S_2 are the areas of the formation covered by the stimulation for, respectively, the first and second stages of development on the date the isobar map was constructed; and $S_{3\ тек}$ is the current area covered by development of the formation during the third stage on the date the isobar map was constructed.

In estimating oil reserves in accordance with formula (5), it is necessary to substantiate the initial and minimal final formation pressures. It is proposed to determine statistically the initial formation pressure in the commercial test-sector area by well in which it has been brought to the depth of deposition of the average portion of the formation. Since the production mechanism for developing the deposit is elastoplastic and quasiclosed, the reservoir pressure measured in wells from which a definite amount of crude has been recovered initially has been understated. Because of this, the initial formation pressure is determined according to the dependence of the current formation pressure upon the cumulative withdrawal of crude. The minimal formation pressure at the concluding stage of developing the deposit is calculated by the existing methods for artificial lift, and it is based upon the lower limit of profitability of the final flow-rate of the wells. The existing technical data of resources for the recovery of crude and the phase state of the hydrocarbons in the stratum enable a minimal formation pressure not lower than 10 MPa to be recommended for the final stage of developing the Bazhenov-suite deposit.

Using the upper and lower limits of the formation pressure as 47 and 10 MPa, we get $\Delta p_1/\Delta p_2 = 2.5$ and $\Delta p_{3\ тек} + \Delta p_{3\ ост} = 21$ MPa.

According to formula (5) and, taking substantiated parameters into consideration, the specific recoverable oil reserves were estimated for the commercial-test sector on three dates (July 1981, 1982 and 1983). In so doing, precision in determining the reserves was influenced mainly by the degree of validity of construction of the isobar map, the function $p_{пл} = f(K)$, and the validity of the initial formation pressure.

Evaluation of the maximum possible error in determining V according to formula (5) at the Salym field's commercial-test sector indicated that it does not exceed 20 percent, even with biased application of all the distorting factors. At the same time, a formalistic application of the specific reserves obtained for the commercial-test sector to other sectors of the field, when more than 2/3 of its area is represented by collectors with worse recovery potential ($Q < 50$ m³/day), overstates considerably the recoverable oil reserves of the Salym field's Yu_0 formation. Correction factors cannot be introduced because of the lack of test operations of the sector of the deposit in wells with initial flow rates of less than 50 m³/day.

Specific reserves were evaluated for productive sediments of the Yu_0 formation of the Salym field's commercial-test sector by the independent methods

examined in this article. The results obtained indicated good agreement for them and, consequently, sufficient reliability of the established reserves.

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Modeling the Bazhenov Suite

UDC 622.276.031.53

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 6, Jun 84 pp 33-38

[Article by I. D. Umrikhin, S. G. Vol'pin, N. I. Dneprovskaya, Yu. M. Smirnov, O. V. Lomakina, T. V. Vlasova (VNII [All-Union Oil and Gas Scientific-Research Institute], O. A. Moskovtsev (Yuganskneftegaz [Yuganskneftegaz [Yugansk Oil and Gas Production Association]) and V. K. Fedortsov (Glavtyumengeologiya [Main Administration for Tyumen Oblast Geology]): "Formulation of a Hydrodynamic Model of the Deposit and Determination of the Type of Collector of the Salym Field"]

[Text] In order to study the Salym oilfield's Bazhenov suite it is extremely important to develop a hydrodynamic model of the deposit and to determine the type of collector. This suite's deposit is confined to oil-source clay rocks of complicated composition. Because of poor recovery of cores and the difficulties of using well-logging methods, hydrodynamic study of the formation and the wells should be considered the principal method for studying the collector. The scheme for siting wells at the field is shown in figure 1.

The development of a hydrodynamic model of the deposit consists in constructing a diagram of the deposit on the basis of the filtration inflows in the formations that are observed. The macroinhomogeneity of the formation, which includes such indicators as the degree of disjointing, persistence (continuousness), degree of hydrodynamic connection, and so on, are determined in accordance with observations during the filtration process.

For constructing a scheme of the deposit, an analysis of the dynamics of current formation pressures and of cumulative withdrawals by well (figure 2), along with hydrodynamic research, should be used. It is not difficult to establish from figure 2 the interaction of wells 27 and 28 during the observation period. Thus, as the result of a lengthy shutdown of well 28 in the middle of 1975, the rate of drop in formation pressure was slowed, and it even rose somewhat in wells 28 and 27. The later startup of well 28 stimulated an increase in the rate of pressure drop both within it and within well 27. It is apparent from this that the wells interact, and, consequently, a single formation had been drilled into.

It is known from the theory of elastic drive that if a solitary well is drilled into a boundless formation, the connection between flow rate and reservoir pressure can be determined in accordance with the formula

$$p_{пл}(0) - p_{пл}(T+t) = \frac{q(T)\mu}{4\pi kh}[\ln(T+t) - \ln t]. \quad (1)$$

Figure 1. Schemes for Locating Wells: (a) at the Field, and (б) at the Commercial-Test Sector of Operation.

а. 1 and 2 are, respectively, exploratory and producing wells; and 3 is the industrial-test operation sector.

б. 1, 2, 3 and 4 are wells with current formation pressures that are, respectively, low, high (on 1 November 1983), measured in April 1983, and unrepressured wells (repressuring time is less than 20 days) (the numerators are the numbers of wells, the denominators are the current reservoir pressures, MPa); and 5 are the directions of hydrophone listening.

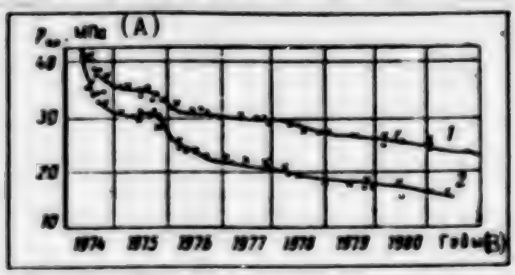

Figure 2. Change of Current Formation Pressure in: (1) Well 27 and in (2) Well 28 (the crosses signify computation points).

А. MPa.
Б. Years.

where $p_{пл}(0)$ and $p_{пл}(T + t)$ are, respectively, the initial and current formation pressures; T is the time from the moment of startup of the well into operation; t is the time from shutdown of the well for measurement of current formation pressure; q(T) is the well's flow rate; and kh/μ is the formation's hydrodynamic conductibility.

During an analysis of the curves of change in current formation pressure within wells that have been operated for many years, t is negligibly small in comparison with T. Therefore, it can be assumed from formula (1) that $T + t \approx T$.

If the cumulative withdrawal $Q(T)=\int_0^T q(T)\,dT$ and the impulse of drawdown $I(T)=\int_0^T |p_{пл.з}(0)-p_{пл.з}(T)|\,dT$. are taken as baseline data, then, in integrating expression (1), we get

$$\frac{I(T)}{Q(T)}=\frac{\mu}{4\pi kh}\psi(T). \qquad (2)$$

where $\psi(T) = \ln T - \mathrm{Int} - 1$.

If the formation is drilled into not by one but by several interacting wells, then the cumulative withdrawal Q(T) in equation (2) should correspond to the sum of the accumulated withdrawals for all the wells. This is equivalent to assuming that a boundless formation drilled into, with one standard well-flow rate, is equal to the flow rate of all the wells, which themselves are viewed as piezometers.

Taking into account expressions for $\psi(T)$, equation (2) is linear relative to the coordinates [I(T)/Q(T); lnT - 1]. Thus, if the model of the formation is correct and interaction of the wells is considered, then the actual curves of change of current pressure in the wells which have been transformed at the given coordinates should be straightline in shape.

Figure 3a shows the functions obtained when the curve of change in formation pressure in well 27 is processed in accordance with formula (2). In the first variant of the processing, it was assumed that it alone drills into the boundless formation. It is apparent from figure 3a that the transformed function obtained is not a straight line. Then it was assumed that the formation was drilled into by wells 27 and 28, that is, the cumulative withdrawal Q(T) was undertaken for two wells. This straightens out somewhat the transformed curve of formation pressure drop in well 27. And only when interaction of all wells is taken into account does the transformed curve acquire the form of a straight line.

The actual curves of change in current formation pressure in wells 55, 24, 54, 64, 28 (figure 3б) were similarly processed. It is apparent from figure 3б that all the transformed functions have a linear nature. Consequently, the wells examined interact, and the productive formation in the area where these wells were drilled can be represented as a single system.

The hydraulic conductivity kh/μ, which is changed from $20\mu^2\cdot$cm/mPa·sec in wells 27 and 28 to $10\mu^2\cdot$cm/mPa·sec for wells 54 and 55, is determined in accordance with the slope angle of straight lines to the axis of the abscissa (see figure 3б). This difference in hydrodynamic conductivity in the area (well 54 is more than 10 km from well 27) testifies to the inhomogeneity of the formation.

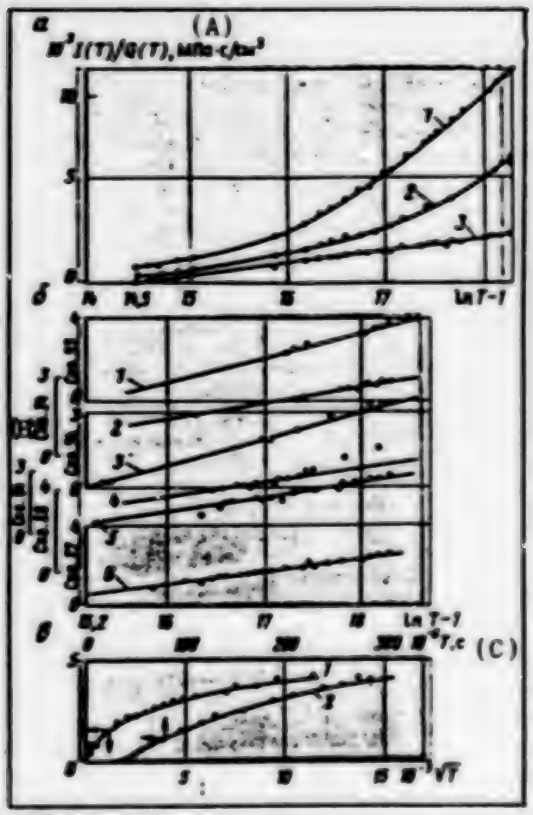

Figure 3. The Results of Processing a Curve for Formation-Pressure Drop in Accordance with a Scheme for a Boundless (a and б) and a Strip-Shaped and a Lens-Shaped (в) Formation.

а. Well 27. 1, 2 and 3--taking into account the withdrawal of fluids from, respectively, wells 27, 27 and 28, and all wells.

б. 1, 2, 3, 4, 5 and 6 are, respectively, wells 55, 24, 54, 64, 28 and 27, taking total withdrawal from all wells into account.

в. 1 and 2--the scheme for, respectively, strip-shaped and lens-shaped formations.

А. MPa·s/cm³. С. T/sec.
В. Скв--well.

Solution of the straight-line problem--computation of the curves of drop of formation pressure in wells in accordance with the basic formula for elastic drive, taking their interference into account--is confirmation of the fact that the model of the Bazhenov-suite formation presents a single system that is inhomogeneous in filtration characteristics. A better coincidence of actual and computed curves in well 27 was obtained where $kh/\mu = 20\mu^2 \cdot cm/mPa \cdot sec$ and piezoconductivity $\chi = 5\ m^2/sec$ (χ corresponds to the data for hydrophone listening), and in well 28, where $kh/\mu = 10\mu^2 \cdot cm/mPa \cdot sec$ and $\chi = 2m^2/sec$. The lower values of the parameters (adopted for the computations) for well 28 in comparison with well 27 can be explained by the presence of a zone of worsened collectors beyond well 28, along the line of wells 27-28.

Let us analyze the actual pressure-drop curves for the field's wells, based upon other existing notions about the oil deposit in the Bazhenov suite. The first notion assumes that the deposit is confined to fractured zones, formed by disjunctive dislocations in the meridional direction [1]. Wells drilled into these zones are high in flow rate, and outside the fractured zones they do not have commercial inflow.

According to another notion, the oil deposits in the Bazhenov suite are confined to the lenses of collectors that are comprised of microbedded fractured varieties of clays [2] that are isolated from each other along the vertical and horizontal by massive weakly fractured clays. There is also the opinion [3] that the entire Salym field has been divided by disjunctive dislocations into separate blocks and there are oil-saturated zones in each of them. There are also other notions about the deposit's structure, but all of them can be reduced down to those indicated.

In considering the existing notions, we schematize the deposit for purposes of comparative calculations. The first representation permits the Salym field to be schematized as strip-shaped deposits, the second and third as separate lens zones.

If a well drills into a formation shaped as an endless strip, then the connection between the cumulative withdrawal and the impulse of change of formation pressure is found according to formula (2), where

$$\psi(T)=\frac{2}{3}\sqrt{\frac{\varkappa\chi T}{a^3}}-\sqrt{\frac{\varkappa\chi t}{a^3}}. \qquad (3)$$

Here, a is the distance from the well to the edge of the strip.

If a well drills into a closed lens formation, then the connection between Q(T) and I(T) also is determined according to formula (2), but in this case

$$\psi(T)=\frac{2\varkappa T}{R_k^2}-\frac{4\varkappa t'}{R_k^2}, \qquad (4)$$

where R_k is the radius of the lens. Formulas (2) and (4) are cited in somewhat different form in work [4].

Expression (2), taking expressions (3) and 4) into account, is the equation of a straight line in the coordinates $[1(T)/Q(T); \sqrt{T}]$ for a strip and in coordinates [I(T)/Q(T), T] for a lens. Thus, if the model for the formation is correct, then the actual curves of current-pressure drop that are transformed in the appropriate coordinates (for a strip or a lens) should be straight-line in shape. In the opposite case, the adopted model does not correspond to reality. Thus, figure 3 cites actual pressure-curve drops for well 27 that are transformed according to the strip and lens schemes. The functions presented are not straight lines, that is, the model has been given incorrectly. Consequently, one must not view the oil deposit of the Bazhenov suite during the observation period as either strip-shaped or closed, which confirms the conclusion drawn in the given work about unity of the formation system.

Hydrophone listening is a direct method for finding the interactions of wells. At the Salym field, more than 20 studies have been made between various wells by this method, but a hydrodynamic tie has not always been noted. The absence of a reaction during hydrophone listening of wells has confirmed many researchers in the opinion that the formation is lens-shaped, that the deposit has a block structure, and its various sectors are isolated.

Based upon an analysis of hydrophone listening, and also based upon in-house experience (we have conducted 15 hydrophone-listening sessions), it was established that the cause of the lack of reaction can vary. First, the reaction for all hydrophone listening sessions was small (the average rate of change of pressure for the reaction curve did not exceed 0.005-0.007 MPa/day). In this case, the rate of change of background pressure in the reacting wells prior to the start of hydrophone listening often was higher. Against the background of the substantial change in pressure (drop or rise) that occurs as a result of

secondary distribution, it is difficult, and more often it is impossible, to single out in the reacting wells the reaction to the change in production mechanism of the activating well. For this reason, positive hydrophone listening results were not obtained in wells 27 and 28 in 1976, although in 1975 the hydrodynamic tie between them was accurately established (figure 4a).

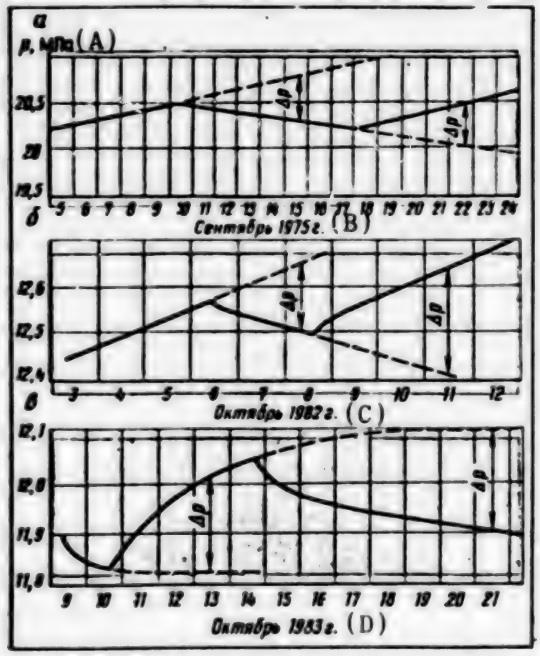

Figure 4. Reaction Curves Obtained During Hydrophone Listening for Wells 27 and 28 (a), Wells 169 and 127 (б), and Wells 558 and 557 (в).

а. q = 185 м³/day.
б. q = 245 м³/day.
в. $q_{\text{наг}}$ = 300 м³/day.
A. p, MPa.
B. September 1975.
C. October 1982.
D. October 1983.

Another cause of the lack of reaction during hydrophone listening can be the small value of the activating impulse. During hydrophone listening for wells 169 and 127 in 1982, the flow-rate of the activating well 169 was 90 м³/day, and, in this case, no reaction was obtained in reacting well 127. Only after the start of operation of well 169, with a flow rate of 245 м³/day, was an accurate reaction recorded in well 127 (figure 4б).

In some cases the basic reason for the lack of a reaction during hydrophone listening sessions conducted during the past 3-4 years is reduction in bottom-hole pressure below the saturation pressure. In this connection, a reaction was not singled out during hydrophone listening of wells 27 and 28 in 1980. During studies of wells 117 and 124 in 1983, the maximum reaction in well 124 (more than 0.1 MPa) was obtained during minimal flow rate (75 м³/day) of well 117. When well 117 operated at maximum flow rate, an insignificant reaction was recorded in well 124--about 0.02 MPa. This is explained by the fact that when the flow rate of the activating well 117 was maximum, its bottom-hole pressure was far lower than the saturation pressure.

In all cases, with strict observance of the technology for hydrophone listening (the formation lacked free gas or contained insignificant amounts of it, the rate of change of the background pressure before start of hydrophone listening was lower than the expected reaction, and the impulse of the activating impulse was the maximum possible), reaction in the reacting wells to change in the production mechanism of the activating wells was recorded unambiguously.

A hydrodynamic tie between wells has now been established at various sectors of the field (see figure 1): at cluster No 7 of producing wells (wells 116, 117, 119 and 124); cluster No 1 (wells Nos 558, 550, 556, 557 and 100), between wells 27 and 28 (between them are production-well clusters Nos 3 and 120); and at the Severo-Salym sector between wells 169 and 127. Thus, hydrophone listening research testifies to a hydrodynamic tie among the wells, confirming the conclusion that the formation system in the area drilled into by its wells is a single one. This does not exclude the existence within the single system of lithologic replacements and cases of lensing-out.

Processing of the hydrophone-listening data by the method set forth in work [5] will enable the type of collector for the Bazhenov suite to be determined. Figure 4 shows the change in pressure in reacting wells 28, 127 and 557 at the startup and shutdown, respectively, of activating wells 27, 169 and 558. The distance between wells 27 and 28 is 2,700 meters, between wells 169 and 127 it is 750 meters, and between wells 558 and 557 it is 325 meters. Crude in the amount of 185 and 245 m^3/day was withdrawn, respectively, from activating wells 27 and 169, and water in the amount of 300 m^3/day was injected into activating well 558.

Figure 5 shows change of χ, computed by the integral method, for portions of the curves at different times of hydrophone listening during startup and shutdown of the activating wells. The ratio t/R^2 was plotted along the axis of the abscissas, that is, three hydrophone listening sessions were conducted as if at a single distance between wells R. The curves of change of χ obtained were identical in form to the theoretical distribution of piezoconductivity [5], which is characteristic for a formation that consists of two media with different filtration parameters. The medium with the best properties was the fluid-conducting medium, the one with the worse was the accumulating medium which feeds the fluid to the conducting medium.

Consequently, the productive formation of the Bazhenov suite can be viewed as a collector with a double medium. It can be fractured-porous or bedded inhomogeneous [5]. If the first scheme is adopted, then it can be confirmed that the matrix participates in the development, and, if the second is adopted, the formations with the worse collector properties participate in the development.

The ratio of formation compressibility β of the two media were determined in accordance with work [5], and the following values were obtained: for wells 27 and 28, $\beta = 5.1$; for wells 169 and 127, $\beta = 4.3$; and for wells 558 and 557, $\beta = 3.5$. Thus the medium with the worse collector properties participates in development, and its formation compressibility is, on the average, 4-fold to 5-fold higher than the formation compressibility of the medium with the better collector characteristics.

Hydrodynamic research accomplished at the Salym field in August-October 1983 completely confirmed the presence in the Bazhenov suite's productive formation of two communicating media with different collector properties. Lengthy observations were made (for 2-3 months) during repressuring of 20 wells of the test sector after their shutdown.* All the wells studied can be divided into

*Current formation-pressure measurements were made jointly with staff workers of the Surgut Section of SibNIINP [Scientific-Research Institute for the Oil Industry].

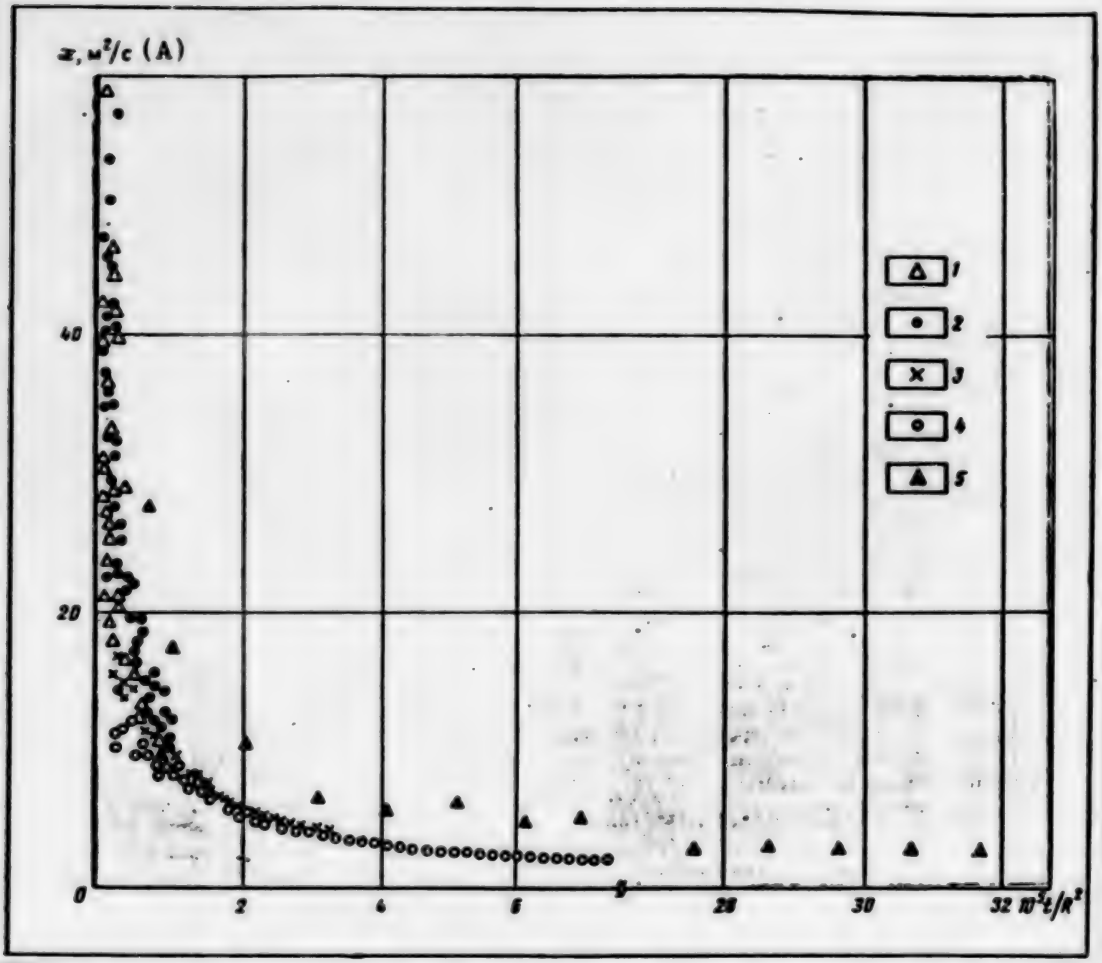

Figure 5. Change of Piezoconductivity Obtained During Processing of Hydrophone Listening Data.

1 and 2 show wells 27 and 28, respectively, during startup and shutdown; 3 and 4 show wells 169 and 127, respectively, during startup and shutdown; and 5 shows wells 558 and 557 during startup.

A. m^2/sec.

two groups according to the absolute value of the current formation pressure, the shape of the curves of distribution of pressure along the well bore, and the pace of repressuring after shutdown.

In the wells of the first group, the current formation pressure (on 1 November 1983) was 20 MPa lower. It was stabilized with a precision of 0.5-1 MPa for 10-15 days from the moment of shutdown of the wells. All the high flow-rate wells fall into the first group. The major portion of them were drilled into the KS-1 formation of the Abalak suite [6].

In the wells of the second group, the current formation pressure is 30 MPa higher. It can hardly be considered as having been established with a precision of up to 0.5-1 MPa, even after 2 months from the moment of shutdown of the wells. All the wells of the second group are low in flow rate. The filtration parameters, which are determined in accordance with the repressuring curve, proved to be tens of times lower in the medium with high pressures than

in the medium with low pressures. An insignificant number of wells of that group were drilled into the KS-1 formation. According to the geophysical data in these wells, it is clogged up to a great degree.

Figure 1б shows the pressures by well that were measured at a depth of 2,700 meters. No consistency in the location of high-pressure wells by area was noted.

Hydrophone listening was performed at various pressures between the wells that were drilled into the media. Water was injected into well 558 at the rate of 300 m^3/day, and a reaction curve was registered in well 557 (see figure 4б). Prior to the start of injection, the current formation pressure was 16.1 MPa in well 558, 33.8 MPa in well 557. During injection the bottom-hole pressure was 42 MPa in well 558. A precise reaction in well 557 was recorded at startup and shutdown of well 558. The curve of distribution of piezoconductivity, which was obtained when the reaction curve was processed was typical for a formation with a double medium [5]. From an analysis of the pressure-drop curves recorded in wells of the second groups, it followed that the inflow from the medium with the high pressures was extremely small.

Thus the results of hydrodynamic research have confirmed the presence in the productive formation of two media with different collector properties and considerably different current formation pressures. Nevertheless, there is a hydrodynamic tie between them. The main inflows of crude were obtained from the medium with the best collector properties and low pressures. Consequently, this medium is fluid-conducting, and the medium with the worse collector properties and high pressures is the accumulating medium, which feeds the fluid to the conductor. The difference in the pressures of the two communicating media is explained by the fact that the extremely weak inflow from the matrix (the medium with the high pressure) does not compensate for the withdrawal from the fluid-conducting medium that occurs in the wells. Strictly speaking, the measured pressures are not formation pressures, since the crossflow of crude from one medium to the other occurs constantly.

Sampling data from drilling and geophysical studies in producing wells have established that inflows of oil are confined not just to the KS-1 formation of the Abalak suite but also to Bazhenov-suite intervals that can also be fluid-conducting.

Conclusions

1. The oil deposit in the Bazhenov suite is a single hydrodynamic system within the zone drilled into by wells.

2. The productive formation of the Bazhenov suite is sharply inhomogeneous in filtration parameters. It can be viewed as a collector with a double medium which consists of a fluid-conducting medium and an accumulating medium, the medium that feeds the fluid conductor.

3. The low hydraulic conductivity and the high piezoconductivity testify to the small volume of the communicating channels between wells (and the small volume of the fluid-conducting medium).

4. Stability of the coefficient of productivity of the wells in time indicates that the volume of the conducting channels remains unchanged. This is occasioned, apparently, by the subordinate value of the horizontal conducting fractures. While their number is large, a reduction of pressure apparently does not heal them, because of the diagenetic silicification of the Bazhenov clays and the forming of a rigid body, which prevent healing of the fractures [7].

BIBLIOGRAPHY

1. Khalimov, E. M. and Melik-Pashayev, V. S. "Searches for Commercial Accumulations of Oil in the Bazhenov Suite." GEOLOGIYA NEFTI I GAZA [The Geology of Oil and Gas], No 6, 1980, pp 1-10.

2. Zaripov, O. G., Sonich, V. P. and Yusupov, K. S. "A Model of the Yu$_0$ Formation of the Bazhenov Suite." Tr. IGiRGI [Transactions of the Institute of Geology and Development of Fuel Minerals], Neftenosnost' bazhenovskoy svity Zapadnoy Sibiri [Petroliferousness of the Bazhenov Suite of West Siberia]. Moscow, IGiRGI, 1980, pp 57-67.

3. Kornev, B. V., Kozlova, M. I. and Bedenko, L. A. "The Role of the Tectonic Factor in the Location of Areas of Oil and Gas Accumulations of the Middle Ob's Bazhenov Suite." Tr. IGiRGI, Neftenosnost' bazhenovskoy svity Zapadnoy Sibiri. Moscow, IGiRGI, 1980, pp 81-88.

4. Buzinov, S. N. and Umrikhin, I. D. Issledovaniye plastov i skvazhin pri uprugom rezhime fil'tratsii [Research of Formations and Wells Where There Is an Elastic Filtration System]. Moscow, Nedra, 1964.

5. "Methodology for Determining Parameters of Inhomogeneity and for Estimating Reserves in Accordance with Hydrodynamic Research Data."/I. D. Umrikhin, N. I. Dneprovskaya, S. N. Buzinov and V. K. Fedortsov. GEOLOGIYA NEFTI I GAZA, No 5, 1982, pp 21-25.

6. Belkin, V. I., Yefremov, Ye. P. and Kaptelinin, N. D. "A Model of Oil Collectors of the Salym Field's Bazhenov Suite." NEFTYANOYE KHOZYAYSTVO [The Oil Activity], No 10, 1983, pp 25-31.

7. Klubova, T. T., Klimushina, P. P. and Medvedeva, A. M. "Peculiarities of the Forming of Oil Deposits in Bazhenov Suite Clays." Tr. IGiRGI, Neftenosnost' vazhenovskoy svity Zapadnoy Sibiri. Moscow, IGiRGI, Neftenosnost' bazhenovskoy svity Zapadnoy Sibiri. Moscow IGiRGI, 1980, pp 128-147.

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Well Logging

UDC 622.276.031.011.43:550.832

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 6, Jun 84 pp 38-43

[Article by V. P. Tolstolytkin and B. N. Zubarev (Yuganskneftegeofizika [Yugansk Oil Geophysics Trust]): "Well Logging"]

[Text] Well-logging studies (GIS's) carried out by the Yuganskneftegeofizika Trust at the commercial-test section of the Salym field is one of the areas of study of Bazhenov-suite petroliferous sediments. Unfortunately, inadequate effectiveness of standard logging methods, the complicated structure of the object, high bottom-hole temperatures, the substantial gas content of the well-drilling mud, and so on, influence GIS results. Therefore, research has been performed in collaboration with, and with the technical and methodics assistance of, VNIInefteprom geofizika [All-Union Scientific-Research Institute for Oil Industry Well Logging], VNIIKRneft', VNIIYaGG [All-Union Scientific-Research Institute for Nuclear Geophysics and Geochemistry], MINKh i GP [Moscow Petrochemical and Gas Industry Institute imeni Akademic I. M. Gubkin] and other institutes. In 1982-1983 GIS was conducted under special programs at 21 wells of the active inventory and 13 wells that had been taken out of drilling. One of the problems facing the trust was that of studying the potential for the use of well-known geophysical methods for obtaining information about the collector rocks. For this purpose, density gamma-gamma logging (GGK-p), multiple-sonde neutron logging (NK), acoustic logging (AK) in various modifications, spectrometry of the natural gamma radiation and pulsed neutron-neutron radiation, as well as logging by induced polarization (VP) and by means of downhole acoustic television (SAT), were performed.

An analysis of the data obtained showed that the Bazhenov suite is complicated by rocks that are sharply varied in lithology and physical properties. This confirmed once more the conclusion previously drawn on the basis of data of a standard complex that this suite is represented by an alternation of intercalations of rocks basically 0.2 meter thick.

The use of GGK-p, NK and AK is more promising, in our view, for singling out collectors and determining their effective capacity. The indications of each of them are closely connected with the water content and porosity of the rock. Moreover, the fissuration and compressibility of the rocks affect AK results. However, a substantial difference in the geophysical characteristics of the cross-section is associated not so much with change in the filtration-capacity properties of the rocks as with differences in their lithological and element composition.

The presence of petrophysical ties and certain a priori data (mineralogical density, the travel time of the acoustic signal for the shell and for clayey materials, and others) about the rocks that make up the Bazhenov suite are necessary for an objective qualitative and quantitative interpretation of the GIS data. The existing functions have been constructed on the basis of poorly representative data or for the suite as a whole, without taking the lithological differences of the various intercalations into account.

Researchers who have been studying the Bazhenov suite still have not arrived at a unified opinion about its lithological structure. In wells that have been drilled into without coring, the question of lithological disjointing was not even raised.

Yuganskneftegeofizika Trust workers made a detailed correlation of the Bazhenov sediments and the underlying Abalak suite under a complex of GIS's that included lateral logging (BK), radioactive logging (RK), AK and VP. This was a further development of the scheme for correlation that was proposed previously by V. V. Khabarov and others. Based upon the research data, 51 intercalations were singled out, of which 17 (I-XVII) were in the Abalak and 34 (B-1 to B-34) in the Bazhenov suite. They are well traced within the commercial-test sector and they are distinguished from each other by geophysical characteristics. An analysis of the spread of various intercalations over the area indicated that their geophysical properties and, consequently, lithology and physical properties, were not constant. Also noted was the lensing-out of one intercalation (B-14). Differences in physical characteristics of the intercalations over the area permit hypothesizing of the possibility of a transition from zones of development of collectors within various intercalations to zones in which they are absent.

Based upon a priori geophysical information and on a correlation made in accordance with descriptions of coring that was performed by specialists of various organizations, it has been possible to describe lithologically the intercalations that have been singled out. These data can be used in studying cross-sections of wells drilled in. In the cross-sections, four types of density differences were defined--limestones and dolomitic limestones; clay marls and marls, aleurite clays, and siliceous clays (silicites)--and three types of clays proper: massive bituminous, microbedded bituminous and weakly bituminous clays. This description of Bazhenov suite rocks obviously is not final, but at the same time it can be used in analyzing GIS data.

SAT [downhole acoustic television] is considered one of the promising geophysical methods for studying Bazhenov sediments. This is occasioned by the fact that collectors of this type do not have counterparts in domestic practice: a core taken from a well is not adequately representative. Moreover, some researchers hypothesize that the collectors are confined to intervals from which the core is not brought to the surface because of peculiarities of its structure. Therefore, it was extremely interesting to obtain an idea of the structure of the well's walls that intersect the Bazhenov suite.

Studies with SAT equipment have been performed in three wells. A substantial negative effect of the gas found in the drilling mud was discovered. Thus, in well 563, the arrival of gas from Abalak suite intercalations was established, so the solution facing the overlying Bazhenov suite was intensely invaded with gas. Such a medium strongly absorbs acoustic signals, preventing the reception of qualitative data about the Bazhenov suite interval. Within the Abalak suite, dense intercalations were distinctly visible in SAT photographs, and their presence is confirmed by RK data. A portion of the intercalations is observed in less than the whole surface of the well's walls, obviously indicating that they are lenticular.

In well 565 the effect of the gas was manifested in breaking of the seal on downhole instruments, and, as a result, low-quality data was obtained. Despite this, definite peculiarities of the Bazhenov suite could be singled out in the photographs. The well's walls within the suite are marked by approximately identical acoustic signal reflectivities, and dense rocks that were singled out in accordance with the GIS complex were distinctly visible against the background. A somewhat below-average reflectivity was characteristic of the lower (intercalations B-1 to B-4) and upper (intercalations B-25 to B-34) parts of the suite, which satisfactorily accords with the AK data. Anomalous attenuation of the reflected signal within the entire well surface was noted at the boundary of intercalations B-18 and B-19. This is interpreted as a horizontal fracture at the contact of intercalations of different lithologies. Its location within the producing interval was established.

Based upon the first SAT-method research, it can be noted that it gives specific information about the structure of Bazhenov and Abalak suite rocks. At the same time, research can continue only after modernization of the apparatus, because the constant presence of gas in the drilling mud creates substantial technical and methodics interference, which lead, on the one hand, to the apparatus breaking down, and, on the other to nonreceipt of the required information.

In order to single out oil-saturated collectors in the sector, independent information is required about petroliferousness obtained on the basis of analyzing coring or of studies of the wells. A study of the coring in the laboratory does not give an unambiguous conclusion about the oil saturation of a collector. Consequently the basic data that indicate productiveness of a sediment being studied are the results of tests and study of production wells. However, even these data are not completely objective, since well productiveness depends not only upon the filtration-capacity and energy properties of the rocks drilled into but also upon the conditions under which they were drilled into. The use of weighted drilling muds, which create substantial repressuring when formations are drilled into, leads to a substantial reduction of the productiveness of the wells and to great difficulties in mastering them. Thus, well 135 was operating for a long time with a flow rate of 2-10 m^3/second. In November it was sharply increased to 100 m^3/second or more, although no kind of operations to intensify the inflow had been conducted either within it or within neighboring wells. This can be explained by a substantial worsening of the permeability of the formation's well zone after drilling and, later, self-cleaning of it.

Work with formation testers was accomplished in well 554 after the upper portion of the suite was drilled into. As a result, an oil inflow of 9 m^3/sec at a drawdown of 13.0 MPa was obtained. Manometer measurements indicated that the bore pressure of the drilling mud in the well was close to the formation pressure. After drilling another 18 meters into the cross-section with the use of a heavier solution, formation testing was again performed in the interval that covered the newly drilled-in and the preceding portion of the cross-section. In so doing, an inflow of strongly gassed filtrate of drilling mud was obtained from the formation at a flow rate of 3.4 m^3/sec at a drawdown of 12.3 MPa. Manometer measurements indicated that static repressuring equal to about 2 MPa was acting on the formation. The example cited confirms

the influence of drilling conditions on the productiveness of wells. Thus, when analyzing test results objectively, only productive wells can be considered.

In calling attention to all the difficulties of using the GIS method in wells that are being drilled, Yuganskneftegeofizika Trust simultaneously did research on active wells in order to single out the working intervals. The main difficulties in using the GIS method when monitoring the process of developing the test sector are associated with the peculiarities of the design of production wells: the presence of an uncemented perforated liner facing the productive intervals, the thin-bedded nature of the sediments, the large gas factor, the lack of sumps, and so on. In such wells the perforations do not contact the producing intervals and sometimes even are located clear of them. Therefore, it is possible that a complicated movement of an inflow of fluid, both within the liner and outside it (right to the closed circulation cells) can occur.

The basic method for singling out the operating strata is flow metering (hydrodynamic and thermoinductive). However, the indicated difficulties do not allow it to be used with high effectiveness. Because of this, the basic method for singling out working intervals has been highly sensitive thermometry. Its advantage lies in the possibility of indicating fluid-inflow movement without direct contact with it by an instrument sensor. Moreover, thermometry is effective in studying weak inflows.

In order to increase the informativeness of the methods, wells were studied in various operating modes. In so doing, the most informative (with an absence of interformation crossflows) was thermometry in a shut-down well, since it permits the intervals of fluid motion throughout the Yu_6 formation to be fixed directly. The effectiveness of thermal research rose greatly when measurements by TEG-36M equipment began to be modernized in the Laboratory of Geothermal Research of MINKh i GP. An example of interpretation of GIS data in well 117 is shown in figure 1. The well was studied under three drawdown modes (flow-bean diameters were 4.8 and 16 mm). The bottom-hole pressures were, respectively, 16.5, 16.1 and 12.7 MPa. Four intervals of anomalies, three of which are interpreted as being connected with throttling down and calorimetric mixing and one with the design peculiarities of the well, were noted on the diagrams. This agrees well with the results of other methods. Member C_2 is more complicated for interpretation because of the presence therein of an oil-water contact when the well was operating on a 4-mm flow bean and because of an increase in the screening influence of the flow from underlying producing intervals during operation on 8-mm and 16-mm flow beans. These intervals should be viewed as the zone of inflow, without drawing its boundaries in detail. For all methods, the interval below the foot of the Bazhenov suite, which corresponds to the XVI layer of the Abalak suite, is noted as the most productive. From it also comes gas, which is well apparent from the thermometry curve taken during maximum drawdown ($p_{заб}$ = 12.7 MPa).

A negative temperature anomaly, which can be associated with an inflow of gassed liquid, is observed much lower than the foot of the Bazhenov suite. They confirm the data of moisture measurement and of mechanical flow metering.

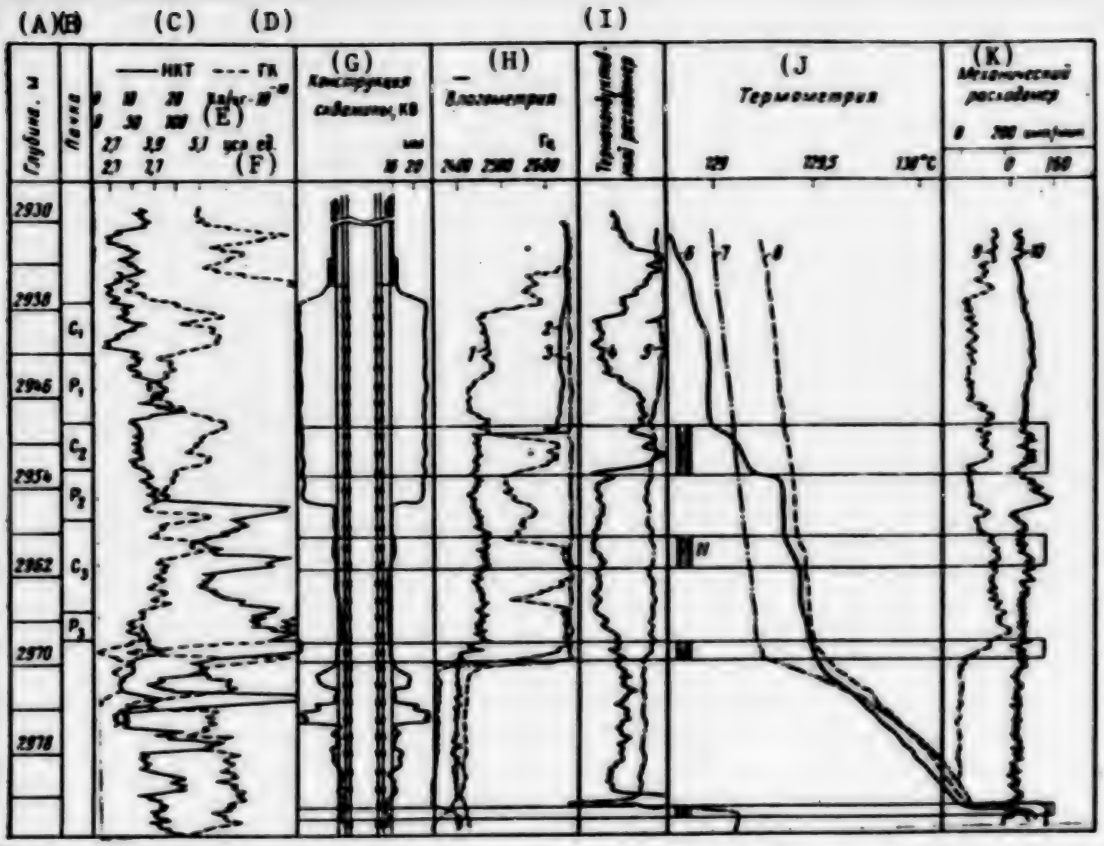


Figure 1. Singling Out Producing Intervals in the Example of Well 117 of the Salym Field's Test Sector.

Curves:

1, 2 and 3: moisture measurements that are recorded on, respectively, 8-mm, 4-mm and 16-mm flowbeans.
4 and 5: thermoconductive flowmetering recorded on, respectively, 4-mm and 16-mm flow beans.
6, 7 and 8: thermometry recorded on, respectively, 4-mm, 16-mm and 8-mm flow beans.
9 and 10: mechanical flowmetering obtained on, respectively, 8-mm and 4-mm flow beans.
11. Intervals of inflow into the liner.

A. Depth, meters.
B. Member.
C. Tubing.
D. Gamma logging.
E. Kl/kg.
F. Arbitrary units.
G. Well design, KV.
H. Moisture measurements, Hz.
I. Thermoinductive flowmetering.
J. Thermometry.
K. Mechanical flowmetering, imp/min.

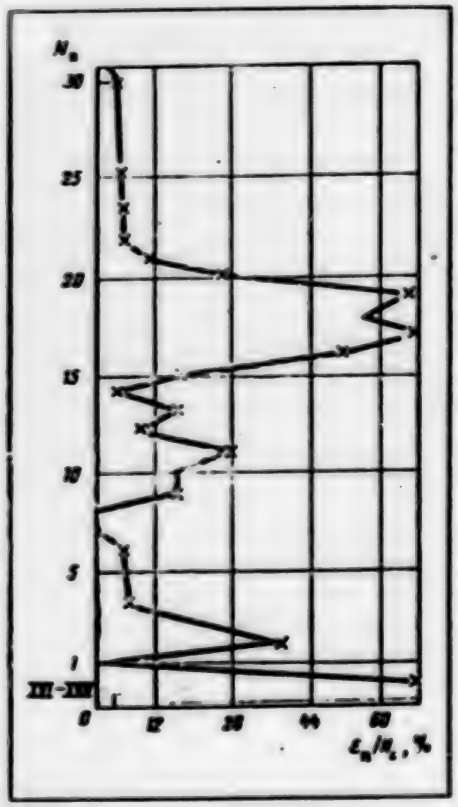
As a result of a study in 10 active wells, 50 producing intervals have been noted, and, in addition, an inflow of fluid was noted in 11 wells from intervals situated below the depths permissible for instruments. The thickness of the various operating intervals varies from 0.3 to 2.5 meters. Their total thickness for some wells is 2.5-5.5 meters (8 meters in two wells), and it is apparently marked by effective oil-saturation capacity of the collectors. The statistical distribution of oil-saturated collectors by size (figure 2)

Figure 2. Statistical Distribution of Oil-Producing Intervals Along the Cross-Section of the Bazhenov Suite in the Test Sector.

N_c = 18, the number of wells studied.

$N_п$ is the number of intercalations correlated:

1-34 of the Bazhenov suite.
XVI-XVII of the Abalak suite.



enables definite conclusions to be drawn about the petroliferousness of the object being studied. It is apparent from figure 2 that the main inflow is obtained from two intervals of the cross-section. The first is confined to the middle portion of the Bazhenov suite (intercalations B-16 to B-19), which are represented by microbedded bituminized clays. Collectors are encountered in these intercalations in 50 percent or more of the wells studied. According to the data of the standard GIS complex (BK, GK and NNK [neutron-neutron logging]) no essential differences in the nature of the collectors and noncollectors is observed in the given interval.

The second productive interval is confined to the intercalations B-1 to B-2 of the Bazhenov suite and intercalation XVI of the Abalak suite (V. I. Belkin has named the latter intercalation KS-1). Intercalation XIV, situated below it, which has geophysical properties similar to those of intercalation XVI and which includes oil-saturated collectors, obviously should also be included here. Intercalations B-1 and B-2 are complicated by aleurite clays. Intercalations XIV and XVI are represented by dense rocks--limestones or dolomitic limestones with varying amounts of clayey material that contain oil in cavernous-fractures varieties. The thickness of the XVI intercalation in the commercial-test sector varies from 0.4 to 1.5 meters. For this intercalation, the authors established a correlation function between the specific electrical resistance and the natural radioactivity. A trend was noted for a sloping of the points characteristic of high inflow rates from the established line of regression in the direction of reduced natural radioactivity. However, insufficient data per well does not enable a judgment to be made about the productiveness of the given intercalation.

Aside from the two indicated intervals, an interval of oil-saturated collectors that is confined to intercalations B-9 to B-11, which are represented mainly by microbedded bituminized clays, is noted with lesser frequency. Fluid inflows are encountered sporadically in the upper portion of the Bachenov suite, and, moreover, a portion of them was singled out with insufficient confidence because of the lack of precise data about the perforation intervals of the liners.

Because of the impossibility of performing hydrodynamic flowmetering, one cannot evaluate with precision the relationship of the flow rates of fluids that come from various intervals. However, a singling out of the working intervals in the middle portion of the Bazhenov suite in low flow-rate wells indicates that the main inflows are obtained from a lower object--intercalations B-1 to B-2 of the Bazhenov and intercalation XVI (and, possibly, XIV) of the Abalak suite. In high flow-rate wells, where there are oil-saturated intervals in various portions of the cross-section, when the wells go to work the intervals in the middle portion of the suite go almost unnoticed against the background of the inflow from below, which predominates. In studying various wells of the experimental sector that are working at a low flow rate (or are shut down or are idle), intervals with an anomalously low temperature gradient (wells 106, 128, 113, 559 and others) are observed within the Bazhenov suite and the overlying Achimov suite. This is associated with crossflows of fluid along the well bore within the productive proportion of the cross-section. Such a process is possible as a result of the pressure drop between intercalations being worked jointly.

Figure 3 shows the data of a study of well 128. The most interesting result is the establishment of a crossflow of oil in a shutdown well, from the middle portion of the suite underneath, which was reflected in the temperature curve in the given interval. The intercalations here are marked by an

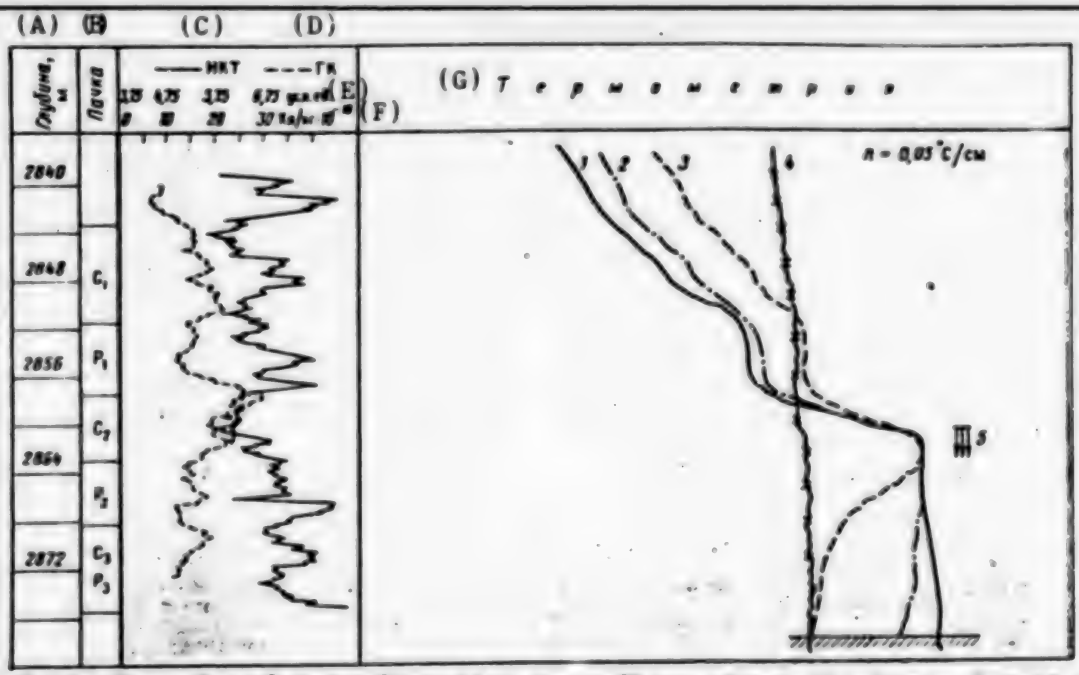


Figure 3. An Example of Interformation Crossflows along the Bore of Well 128 in the Bazhenov suite. The curves 1 and 2 are for a well shutdown of, respectively, 10 and 36 hours; 3 and 4 for an operating well that has started up after, respectively, 10 and 36 hours of idle time; and 5 for the direction of cross flow.

A. Depth, meters.
B. Member.
C. Tubing
D. Gamma logging.
E. Arbitrary units.
F. Kiloliters/kilograms.
G. Thermometry.

anomalously low gradient and specific change thereof during lengthy shutdown of the well (by the curve after 7 and 36 hours of shutdown). This indicates that a reliable hydrodynamic tie between the oil-saturated collectors of the Bazhenov and Abalak suites, which are found in various portions of the cross-section, is absent. It is apparent that a hydrodynamic tie in terms of area is lacking also between the collectors which are confined to the middle portion of the Bazhenov suite and are represented by microbedded clays.

Conclusions

1. The Bazhenov suite is represented by an alternation of thin rocks of various types, primarily of clayey composition, that are correlated with confidence in the cross-sections of wells and experience substantial changeability in terms of area in some cases.

2. The GIS methods used do not enable the productiveness and effective thickness of the collectors to be established prior to sampling of the well.

3. The oil-saturated collectors are confined to rocks of two types: microbedded clays and dense rocks.

4. Reliable ties between the collectors of the first and second types and between collectors of the first type, in terms of area, are lacking.

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Artificial Lift

UDC 622:276.53

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 6, Jun 84 pp 43-44

[Article by V. V. Samardakov, V. M. Nozhin and Yu. I. Volkov (NGDU [Oil and Gas Recovery Administration] of Pravdinskneft' [Pravdinskoye Oil Production Association]): "An Analysis of Artificial Lift in Oil Recovery at the Salym Field"]

[Text] The Pravdinskneft' Oil and Gas Recovery Administration is working to realize the approved program of commercial-test operation of the Bazhenov suite at a sector of the Salym field. During the test operation, much oilfield geological research has been done, the hydrodynamic tie between various wells and their oilfield performance have been studied, the intensity of the drop in reservoir pressure and the physico-chemical properties of the oil and gas have been determined, and some other important oilfield questions have been clarified.

In the testing process, when the test section was drilled over, about half of all the producing wells proved to have low flow rates. After the withdrawal of 1.4 million tons of crude, the deposit's reservoir pressure fell substantially, its maximum reduction (to 25.6 from an initial 32 MPa) being recorded at well 28. As a result, a portion of wells that had flowed earlier moved into the ranks of the low flow-rate wells. On 1 January 1984, of the total active inventory, which numbered 59 wells, 29 had a flow rate of less than 10 tons/day. Moreover, as a result of low flow rates, 14 wells were idle.

One of the simplest solutions for intensifying oil recovery from low flow-rate wells is the conversion thereof to artificial lift. However, certain doubts arose, since the wells' gas factor reached 200 m³/t or more. During 1983, by way of experiment, 21 wells that were equipped with NSN2-32 and NSN2-43 pumps were converted to artificial lift (SShN [sucker-rod pump]).

The underground equipment can be divided, in regard to configuration, into two groups: a liner 500-800 meters long, the NSN2-32 (or NSN2-43) pump, and a sucker rod; a gas anchor of platelike design or auger type without liner, an NAN2-32 pump, and a sucker rod. Sucker-rod well pumps were lowered to a depth of 1,200-1,415 meters.

Oilfield observations and analysis of the wells' production mechanism showed that the artificial lift method can be operated steadily at not one of the 21 converted wells. All of them can be operated only on periodic modes with different periods for building up the level (see the figure). The period for recovering liquid varies from 5 to 196 hours, pump delivery from 0.6 to 13 m³/day.

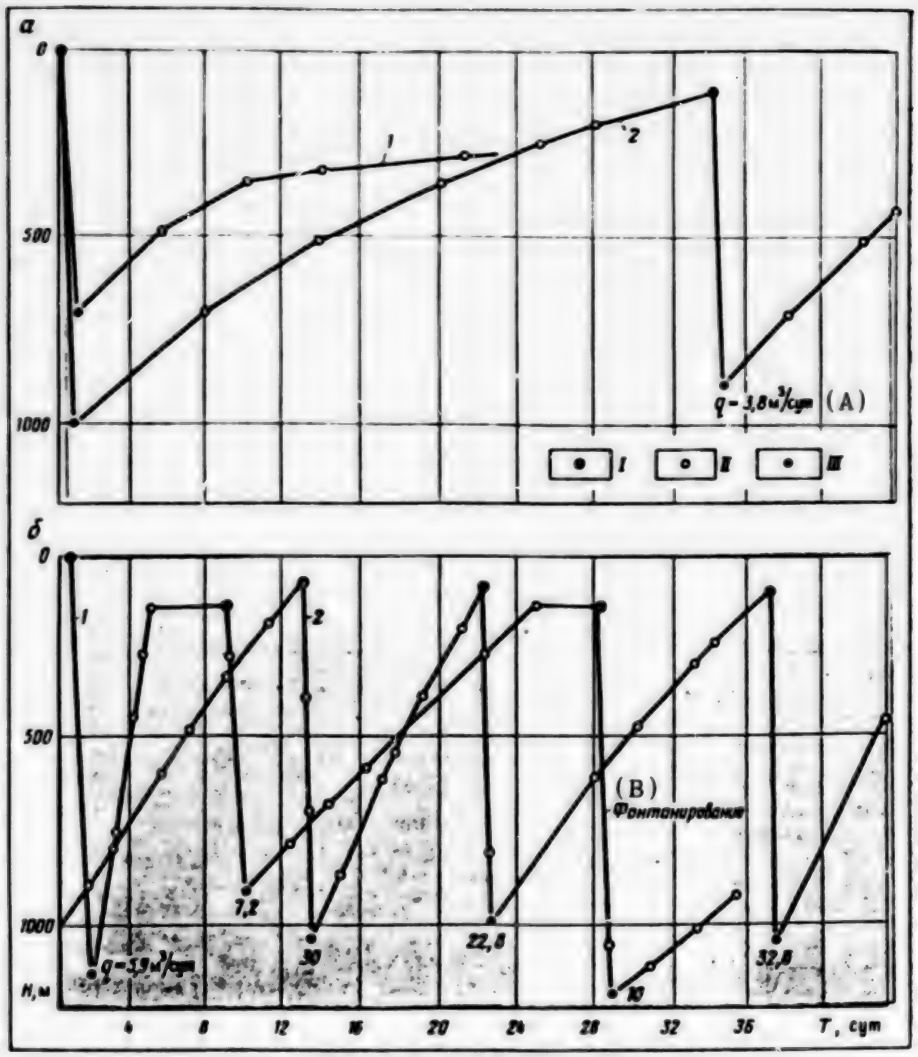
With SShN operation, the following typical features are noted: interruption of delivery occurs when the well's dynamic level is reduced to a depth of 900-1,000 meters, or, in some wells, to 700 meters (see figure a, curve 1). In some wells equipped with SShN, at a pump descent depth of 1,400 meters, it was noticed that, with natural flow, the dynamic level dropped below the pump suction, and withdrawal of liquid was much greater than during pump operation (see figure б, curve 1).

The use of gas anchors promotes more stable well operation. With a gas anchor, the level of the liquid in the wells can be reduced down to pump suction, but, in so doing, the well operates periodically.

The unusual structure of the collector, which is represented by clayey rocks, exerts a definite influence also on buildup of the level. The accumulation period after pumping out varies from 4 to 17 days (see figure в). There is an opinion that with large drawdowns the collector is deformed, and, in so doing, the microfractures can link up as a result of a substantial excess of rock pressure above the bottom hole. However, this notion must be verified, for which the development of special apparatus and new geophysical methods are required.

A comparison of the results of operating wells that flow periodically and work by means of SShN indicated that a growth in flow rate is not observed during artificial lift. Gas influences deep-pump operation greatly. The pump-admission factor does not exceed 0.3. Lowering of liners for deepening the pump suction does not enable this problem to be solved successfully.

Thus, the results of Salym-field operation of wells by artificial lift do not give grounds to be considered an effective means for recovery of crude with pumping jacks. The Pravdinskneft' NGDU faces the task of obtaining as much data as possible about the length of operation of artificial-lift wells in order to adopt a final decision about the desirability of introducing more SShN's. Other methods for recovering oil still have not been tested, so it is



Charts of Periodic Operation of Salym Field Wells:

a. 1 and 2--wells 552 and 134, respectively.
б. 1 and 2--wells 109 and 114, respectively.

I. Start of SShN [sucker-rod pump] delivery.
II. The current level.
III. Absence of delivery.

H. Dynamic level, meters.
T. Period of accumulation and withdrawal, days.

q. Flow rate of the well.

A. q, in m³/day.
B. Natural flow.

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planned to test the operating reliability of periodic gaslift, and equipment is being readied for sampling thermal lift with the use of lift heaters.

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COMPUTER-PRODUCED CONSUMPTION NORMS FOR ERECTING WELLS URGED

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 6, Jun 84 pp 61-62

[Article by G. F. Makovey: "The Establishment of Consumption Norms for Material Resources During the Erection of Wells"]

[Text] The modern era of the national economy's development requires constant improvement of national economic planning and of the methodology, methodics and practice of setting norms for material, fuel and power resources. The problem of improving the establishment of norms and standards for the consumption of material, fuel and power resources has become especially urgent, since the gap between actual specific consumption of materials and the norms therefor is still great.

In geological exploration, particularly during the drilling of deep exploratory wells for oil and gas, where material-resource expenditures comprise more than half of all expenditures, the discrepancy between the norms and actual specific consumption of materials is great. This is associated with the specifics of performing these operations, which, in turn, hinders use of the traditional methods for computations.

A qualitatively new stage in setting consumption norms for material, fuel and power resources for performing geological exploration is the creation of an automated system for norms and standards (ASN)--an integral part of ASUP [automated system for controlling an enterprise]. In forming the ASN, we have proposed the following scheme for establishing norms for doing the work of erecting a well (see the figure).

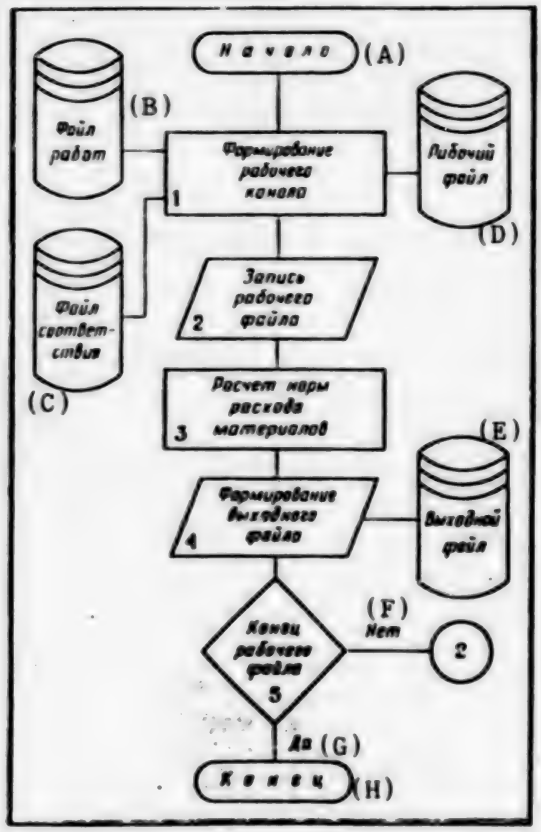
The file that couples the specific materials that are used with the appropriate operations is created as directory information. Each material used is characterized by a definite algorithm, in accordance with which the production norm for materials consumption for a given operation is computed.

The file of the list of operations performed during drilling, which describes with adequate completeness the technological process of erecting a drill rig, serves as the input file. These two files combine and generate the working file (see figure, block 1), which reflects the specific list of operations carried out during the drilling of the given well, with a tie-in to each of the materials and algorithms used for computing the norms for materials consumption. Each recorded item of the working file (block 2) is reviewed in

Functional Diagram for Forming a File of Norms for the Consumption of Materials, Fuel and Power Resources During the Erection of a Well.

1. The forming of a working channel.
2. Recording of the working file.
3. Computation of material-consumption norms.
4. The forming of the output file.
5. End of the working file.

A. Start.
B. The file of the operations.
C. The criteria file.
D. The working file.
E. The output file.
F. No.
G. Yes.
H. End



turn, and specific materials-consumption norms are computed (block 3) on the basis of the data on the list of materials used and the operations carried out. A file (block 4) that contains a list of the operations performed and the norms for the consumption of materials during the performance thereof is formed as the output file.

In the scheme examined, the basic task consists in providing mathematical models for computing the norm for one material or another. These models should consider the peculiarities of the technological process of performing the operations and be oriented toward the use of computer-equipment resources. Consequently, the degree to which the operations are broken down in detail must allow the material expenditures to be considered most completely by computational methods. We have undertaken an attempt to create mathematical models for computing norms for materials consumption, taking into consideration the information sources for that portion of the materials mix that makes up the greatest share in the total cost of the materials used for drilling a well. It is obvious that the greatest benefit will be obtained when computing consumption norms for the entire mix of materials that are used.

The specifications for erecting a well can be a source of input information for computing consumption norms for materials, fuel and energy. Later, as ASUP tasks are solved, the results from solving the tasks set for computer-assisted preparation of the preliminary design and of budget estimates can become a source of input information.

Computing production norms (for the execution of work) in accordance with the proposed scheme will allow, first, norms of a higher level to be obtained, by the path of aggregation, and second, the necessary information for solving ongoing planning tasks to be provided.

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MINISTER OUTLINES TECHNICAL PROGRESS IN UKRAINIAN COAL INDUSTRY

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 1, Jan 84 pp 3-9

[Article by N. Grin'ko, UkSSR Minister of the Coal Industry: "Technical Progress -- the Basis for Improving the Efficiency of Coal Mine Operations"]

[Text] The rational development of a socialist economy is unthinkable without improvements in the fuel and energy complex. Linked to all sectors in the country, it plays a leading role in the development of production. The proportions and rates in the development of productive forces, the acceleration of scientific and technical progress and solutions to fundamental social economic tasksare directly linked to growth in energy resource consumption. Therefore,it is now extremely urgent to solve problems in the further development of energy supplies and the determination of the role of various energy sources.

The USSR's fuel and energy potential is steadily growing, especially during the postwar years. Compared to prewar 1940, electrical energy output has increased 24 fold, oil extraction 18 fold, gas more than 100 and coal almost 5 fold. Our state continues to increase oil and gas extraction, but these resources are needed above all by the chemical industry. The construction of large thermal electric power plants using oil or gas in the European part of the USSR was stopped several years ago. Coal has the highest share in the country's energy balance and will retain it during the next five-year plan. The future high rates of coal development will be primarily through the operational introduction of unique fields in Kazakhstan and Siberia. At the same time, the Donets Basin continues to have a leading role.

Up until the beginning of the 10th Five-Year Plan, miners in the Ukraine were annually increasing extraction. While during the first 15 postwar years this grew mainly through increases in the number of mines, later intensive factors predominated: increases in mine production capacity through reductions in the number of technical units. During these years the sector's intensification favored highly effective measures for the technical modernization of mines, and, above all, the basic element, mucking operations. There was a practically universal (at gently sloping seams) transition to narrow web stoping, at most longwalls knock-down conveyors were replaced by mobile ones and individual posts by mechanized supports. The share of coal extraction from longwalls equipped with mechanized complexes increased to 60 percent. Mine technical modernization increased loadings per working face, improved labor productivity in coal extraction and a number of other techno-economic indicators of the sector's operation.

However, during the 9th Five-Year Plan there was a decline in the growth of coal extraction in the republic, in the 10th Five-Year Plan there was stabilization and later a decline due to deterioration in the main techno-economic indicators for the sector's operation. This is because the Donbass is the most industrially developed bituminous coal regions in the country. In the upper horizons, free areas for the construction of new mines are practically exhausted. Therefore, increases in extraction have, for a number of years, been due to intensive deepening of mining operations. This deepening averages 12 - 14 meters annually.

The increased depth of mining is accompanied by a steady deterioration in mining geological conditions; increases in rock pressure, temperature , and danger of gas in seams. Moreover, by the beginning of the 11th Five-Year Plan all mines where their use was effective had been completely equipped with existing types of complexes intended for working seams more than 1 meter thick. In order to improve labor conditions at working faces, we started using complexes in thinner seams than intended by their specifications. The shifting of equipment to seams which were not big enough required digging out roofs or floors. This reduced the reliability of excavation machinery, increased the rock load on transport and other equipment and reduced coal quality.

In view of the stabilization of coal extraction volume in the next five-year plan and the expected deterioration of the mining geological situation due to deeper operations, the sector's efficiency can be increased mainly through mine technical modernization.

Although accelerated technical progress is important for improving the efficiency of all sectors, it has special significance for the coal industry. Here, as a rule, every new face is operating in more difficult conditions than the preceding one and each new horizon is deeper than before. This makes technical progress become essentially the sole factor counteracting the deteriorating conditions of mine operation. Future technical progress in the sector will be directed towards eliminating existing disproportions in production technical standards, taking into consideration the expected conditions of coal mine operation.

Forecasts show that in the future the share of UkSSR Minugleprom coal extraction from seams up to 1.2 meters thick will increase to 85 percent, approximately the share of such seams in commercial [promyshlennykh] reserves. Thus, in the near future, the Ukrainian coal industry will be one of deep mines working thin and very thin seams in difficult mining geological conditions. This especially increases the importance of technical progress, as many technical solutions which are quite acceptable for shallow and medium depth mines are unsuitable for deep ones. Therefore technical developments should be linked to real mining geological conditions occurring in the foreseeable future.

The beginning of the 1980's was marked by new party and government concern about the coal industry's technical modernization. The sector's workers have begun implementing measures for the further development of mines in the UkSSR during the 11th Five-Year Plan and for the period up to 1990. In September 1981 the CPSU Central Committee and the USSR Council of Ministers passed the Decree: "On Measures for the Acceleration of Technical Modernization in Mines of the USSR Ministry of the Coal Industry". Working from this decree, orders were given to the ministry. These documents are now being put into practice.

This is also the time of initiating the implementation of the CPSU Central Committee and USSR Council of Ministers Decree of 12 July 1979: "On Improvements in Planning and Intensification of the Economic Mechanism's Effect upon Increased Production Efficiency and Work Quality", which laid the basis for targeted comprehensive programs for the development of regions, sectors and for large scientific and technical problems.

A July 1980 decree of the Ukrainian Communist Party Central Committee and the UkSSR Council of Ministers defined six republic targeted comprehensive programs. These include the Energy Complex Program for improving the republic's energy supply on the basis of improvements in the technical base of fuel and energy branches, including the coal industry. Other regional and branch target comprehensive scientific-technical programs are also directed towards solving problems in the technical modernization of the Ukrainian coal industry. Enterprises, organizations, scientific research and planning design institutes in our ministry and in other branches and departments and also directly participating in their implementation.

The targeted comrprehensive programs call for fundamental improvements in branch operations on the basis of coal mine technical modernization. Pace setting rates of technical modernization compared to deterioration in mining geological conditions should assure the fulfillment of program targets and improve the branch's techno-economic indicators.

The April(1983) Ukrainian Communist Party Central Committee Plenum examined the implementation of republic targeted comprehensive programs and measures to improve the roles of institutes in the UkSSR Academy of Sciences and branch institutes in problems of scientific and technical progress. It stressed the exceptional importance of further improvements in the management of scientific and technical progress, the program-targeted method of planning science and technology and made a decision on assuring the timely and complete solution of tasks in all-union and republic branch and regional scientific-technical programs.

For the first time in 5 years, in 1982 UkSSR Minugleprom increased its coal extraction compared to the previous year. There was stabilization and improvement in individual indicators for production technical standards (daily loadings at mines, longwalls, volume and level of coal extraction from comprehensively mechanized faces, volume of combine preparatory opening driving). The fulfillment of the annual plan for coal extraction and increases in volume compared to 1981 are the result of work to utilize production reserves and improve mining operations.

Mines in the Ukraine are continuing to improve production technical standards. Extraction volumes from comprehensively mechanized faces in seams with angles of dip up to 35° increased from 47 percent in 1975 to 66 percent in 1982, while for seams dipping more than 35° the figures were from 6 to 19 percent. The share of combine driving of horizontal workings during this time grew from 15.6 to 28 percent, conveyor use on inclined workings increased from 45.6 to 55.3 percent

and on horizontal workings from 14.8 to 22.8 percent. There are also improvements in mine field preparation and working systems. In gently and moderatly sloping seams there was an increase in the share of panel and horizontal methods of preparation at the expense of reductions in level by level preparation. Working faces in seams more than 1.2 meters thick are equipped with modernized supports and improved operational specifications (KM-87UM, KM-87MP, and KM-87DN).

The comprehensive mechanization of extraction operations at mines working steeply dipping seams is now progressing in two directions: the use of IASchchM and ANShch shield units stoping the coal in broad bands along the dip, and combine complexes with mechanized supports in long faces advancing along the strike. As far as improvement in tunnel driving operations is concerned, work is under way to fit out tunneldriving brigades and improve work organization. In 1982 an additional 30 4PP-2 tunnel driving combines and 24 GPK combines began operation. Progressive flowsheets for driving workings were introduced at 24 sections. In this same year combines drove 28 percent of total horizontal workings. A further increase in driving is possible through increased use of heavy type 4PP-2 tunnel driving combines and KN cutting combines. Twenty tunnel driving combines operated at mines using electrical energy to develop steep seams. The number of tunnel driving combines will grow as mines convert to electrical energy.

In preparatory workings there is expanded use of metal supports, including those with increased pliability and improved specifications. Improved locking joints were used in 1,835 km of workings and 86,400 tons of nickel alloy steel were used. In 1982 the use of pillar free methods was increased and there was somewhat of a reduction in the support of workings by coal pillars. In the future, as "Titan" stowing complexes arrive at mines, it is intended to increase the number of pillar free workings.

Conveyor systems are being introduced and rail and auxiliary transportation improved. In 1982 conveyors moved 55.3 percent of loads in inclined workings and 22.8 percent in horizontal ones. Mines are now using 850 electric locomotives with adhesion weight exceeding 10 tons. There is expanded use of large capacity cars and bottom dump cars. In 1982 loading points were completely mechanized and about half were equipped with pushers.

However, the technical standards of auxiliary transportation still lag behind the demands of modern coal production. The delivery of auxiliary materials and equipment to mines in the Ukraine remains one of the most laborious processes. In many mines there are 2 and 3 stage systems for transporting rock and materials. Systematic shortfalls in the supply of conveyors, cars storage batteries and other transport equipment are having a negative effect on underground transportation.

In 1982 214 mines in UkSSR Minugleprom were equipped with systems for the centralized control of methane content and automatic gas protection. Measures are being implemented to degas coal seams, improve temperature conditions at working and preparatory faces and exand measures against sudden blow-outs of coal and gas. The planned replacement of main ventilators at the more productive installations is under way.

During the 11th and subsequent five-year plans there will be further development of extraction operation comrehensive mechanization and automation. The widespread introduction of complexes, frontal and standardized shield units and the chemical strengthening of wall rocks will permit considerable increases in loadings per working face and improve other mine operation indicators.

The April (1983) Ukrainian Communist Party Plenum said the most important tasks for the republic's coal industry are increases in coal extraction volume from comprehensively mechanized faces, the use of combines for preparatory workings and accelerated development of means and methods for extracting coal without the constant presence of people at working faces. The branch has built and is continuing to build new, technically improved second generation complexes to do this: KM-103's and KD-80's for working 0.7 - 1.2 m thick gently sloping seams; IKM-88's for 1.0 - 1.3 m seams; complexes for the up-dip stoping of 1.0 - 1.9 m seams; KMT's for 1.1 - 2.0 m seams with difficult to cave roofs.. Through their development and introduction it is planned, by 1990, to basically eliminate the cutting of wall rock and replace obsolete combines.

Developmental work is in progress on frontal units for the comprehensive mechanization of extracting seams 0.65 m and thicker without the constant presence of people at the working face. The use of such units will increase daily loading at longwalls to 700 - 900 tons and improve labor productivity of working face personnel 1.8 - 2.2 fold. Possibly, 300 such units will be used at longwalls.

Completely automated methods of coal stoping, using augers, scaper-cutters, short face combines and hydromonitors will be widely used in very thin seams, where it is difficult for people to be at the working face. The goal of such people-free methods is not only to considerably improve miners' working conditions, but also to develop reserves which are not now being worked.

Coal stoping techniques using cutter units are promising, especially for very thin and blow-out prone seams. A new generation of cutter units (SN-75, SO-75 and UST-2M) is now being produced, and KMS-97 and IMKS cutter complexes are also being used..It is intended to increase the use of such units. Planning is under way on the development of new types of units to considerably expand the application range of such devices.

Every third longwall in Ukrainian mines is working on zones where the roof collapses after the coal has been removed. Even small sections of such zones significantly reduce loadings at working faces, increase coal ash content and the danger of injuries to workers. The preliminary strengthening of unstable sections with the help of quick setting compounds, the so-called chemical strengthening of rock, is one of the ways to fight this phenomenon. The chemical anchoring method for strengthening roofs was developed and introduced during the last five-year plan. In 1985 it will be used at 200 longwalls and by 1990 it is planned to convert to a more effective method, involving injections of bonding agents into roof rock.

Mines working steeply dipping seams are concentrated mainly in Tsentral'niy Rayon in the Donbass. Due to the deepening of mining operations, in the future practically all working faces will be in seams with unstable wall rock.

Three-fourths of the rayon's mines will have rock temperatures exceeding the norms. In order to improve the technical standards of operations in thin seams it is intended to create mechanized, automated or remote control complexes and systems for working thin and average thickness seams. In accordance with the Energokompleks program, in the next few years, the KGU-D complex with remote controlled hydraulic supports and the 2ANShch shield unit will be developed. The KG complex and the AOShch shield unit are being developed for seams with weak wall rock. A set of equipment based on pneumatic ballon supports is being developed for working very thin seams without having people at the working face.

The state of preparatory work is one of the factors in successful operations at working faces. It is essential here to expand the use of tunnel driving combines and increase the rate at which workings are driven. Heavy type 4PP-2Shch, 4PP-5, KRT and "Soyuz-19" tunnel driving combines are being developed. These should assure a two fold and greater increase in tunnel driving speed through blow-out prone seams and rock with strengths of 6 - 10. The KN-78 cutting combine is also being developed. To reduce the amount of rock hauled out of the mine, it is intended to expand the use of "Titan-1" crushing and stowing complexes and more modern devices for filling worked out spaces with rock.

As depth increases it becomes considerably more difficult to support underground workings. Even today 15 percent of their total length does not meet technical operating requirements. Our specialists are diligently working on new types of ferroconcrete and nickel alloy supports and new locking joints to improve the condition of mine workings. An important direction here is the further improvement and expansion of pillar free methods of support, based either on the repeated use of preparatory workings or on pillar robbing.

Specialists and production workers in the branch are giving more attention to problems of improving underground transportation. They have developed and built fundamentally new belt conveyors from standardized components which will increase transport productivity by 25 percent and which are more convenient and reliable to operate. The PS-3.5 unit train, ARP-14 and K-14 modern electric locomotives, equipped with the newest automatic starting and electric braking and meeting the best world standards have been developed and approved for series production. When the intended modernization is completed, the automated conveyor transportation of coal will become predominant.

Increasing demands are made upon mine ventilation as working depth, the length of mine tunnels, gas evolution and mine temperature all increase. The branch is developing new ventilation layouts and equipment for the entire range of mining geological conditions in UkSSR Minugleprom. Widespread degasification of mines is becoming an integral component of the process of working gas bearing seams. Temperatures in mine workings are being normalized.

The technological complex at the mine surface now has second place, after extraction operations, with regard to labor outlays for underground coal mining. The branch is improving flowsheets for loading-unloading and transport-storage work based on packet and container delivery of materials and equipment from the association's central bases to the site of their use in the mine. DonUGI [Donets Scientific Research Institute for Coal], jointly with UkrNIIproyekt [State

Scientific Research and Planning Institute for Coal, Oil and Gas Industries of the UkSSR] and NPO Uglemekhanizatsiya [Scientific Production Association for Coal Mechanization] is developing a number of schemes and equipment for improving surface operations and reducing their labor intensity.

Underground coal mining is one of the most complicated production operations and the coal industry is one of the most labor, energy and capital intensive branches of the economy. We are also at the threshold of more difficult mine operating conditions. Basic science should therefore become the main helpmate in the solutions to problems facing the branch. For a number of years, the UkSSR Ministry of the Coal Industry, utilizing various forms of cooperation, has enlisted into the solution of the branch's tasks about 40 scientific research organizations from various ministries departments. Cooperation with institutes of the UkSSR Academy of Sciences is given special importance in the solution of long term problems. The concentration of efforts by labor collectives of miners and scientists on solutions to the tasks posed by the party and government will make possible the success of the program for modernizing the coal industry and on this basis considerably improve the branch's efficiency.

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BASIC ASPECTS OF FUEL AND ENERGY COMPLEXES ANALYZED

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 1, Jan 84 pp 9-16

[Article by A. Reshetnyak and V. Khizhnyak, candidates of economics, and A. Tuzman: "Improving the Organizational Form of Fuel and Energy Complexes"]

[Text] The development of the fuel and energy branches of industry is now based on branch planning assuring a unified technical policy and creating favorable conditions for improving technological processes and selecting effective directions for capital construction. However, operating practice shows that the branch method of planning does not solve many problems in the comprehensive development of regional economies and adjacent branches of industry. As is known, the tasks of territorial planning are the proportional, balanced development of regional economies on the basis of the comprehensive use of resources, improvements in production and social infrastructure, environmental protection and ecological enhancement. The greatest effect is attained through a combination of both planning principles. This is because many interbranch problems arise at the interface between branch and territorial planning. In particular, this applies to improvements in the efficiency of using coal extracted in the Donets Basin.

It is expected there will be an increase in the share of coal in the UkSSR's fuel and energy balance and that the republic's thermal energy supply will depend more on the level of coal extraction. This requires increased attention towards the coal industry as one of the main producers of power generation fuel. A taut fuel balance increases the national economic importance of increased electrical energy production from each ton of coal through the removal of more rock during preparation, improvements in coal quality, transport, storage and combustion.

Problems of improving the quality and efficiency of coal utilization during final consumption and of increasing the conversion of combustible components in the extracted mass into coal preparation products have not yet become basic to the work of coal industry enterprises. The massive conversion of coal mines to gross extraction and the hoisting of rock mass to the surface are significant causes of increased coal ash content and reduced generation potential. The increased free rock grain content, the high degree of coal excavation which includes interbands and wall rock are great hinderances to the direct use of coal as a basic fuel in thermal energy production.

To reduce coal ash content and improve its properties, the rock mass must be processed to restore the initial quality of the coal, and in some cases to

improve it. So far, however, far from all generating coal passes through this stage, as preparation plant capacity is considerably less than the volume of rock mass extracted.

There are often cases where interbedded coal seams are not worked because their ash content is higher than established conditions. These are the so-called ash and thickness unconditioned seams, the working of which at existing mines, with their subsequent processing would be considerably cheaper than compensating extraction at new mines. This situation is explained, on the one hand, by the lack of appropriate economic levers, and, on the other, by departmental fragmentation of coal producers and consumers. The transition to a comprehensive form of industrial organization based on the formation of fuel and energy complexes considerably expands the potentials for improving the efficiency of all public production, and in particular, of the fuel and energy branches.

A strict observation of national economic rather than branch effectiveness is important for the selection of paths and methods in extracting and processing coal for generating electrical and thermal energy. Such an approach makes it possible to not only include existing, but also other potential flowsheets for coal extraction and the advisability of using them to obtain the maximum final product at minimal total outlays.

The fuel and energy branches in an economic region can be comprehensively developed only through the creation of regional fuel and energy complexes. The economic essence of such production associations requires a very definite selection of production units, which make up an economic system of a higher order than individual enterprises. It is obligatory that the production elements in the complex not only have organiztional unity, but also production-technological and economic linkages.

Production and technological unity are the basis for such a complex. For fuel and energy this means including enterprises for the extraction, preparation and use of coal, and in some cases elements of production infrastructure -- transportation (mainly a slurry pipeline system) and auxiliary production facilities.

The concept of a production complex implies the harmonious combination of enterprises united through the production of a single final product in a comparatively small territory. This gives ground for posing the question of creating a new type of complex -- the regional fuel and energy complex -- which can be viewed as a special form of the territorial organization of production to increase the efficiency of fuel use. Such a set of enterprises for the extraction, preparation and use of coal can be viewed as a low level subsystem of the UkSSR fuel and energy complex, entrusted with helping to develop power engineering in the republic.

The branch in the final stage of the production cycle should be the basic element in a regional fuel and energy complex. A thermal electric power station is the core which forms such a complex. The remaining complex forming production elements are selected with a view to satisfying the final element's demand for fuel. Their activities are guided by targets common to the complex and assuring the creation of favorable conditions for attaining the economic goal.

The following are taken into consideration in calculating the economic efficiency of cooperation in forming territorial fuel and energy complexes from newly introduced enterprises: direct outlays for fixed productive capital; related outlays for adjacent operations supplying the core unit with specialized fuel of the appropriate quality; outlays for the construction of transport systems for delivering fuel to the consumption site.

Enterprises making up a territorial fuel and energy complex are equal partners and do not lose their economic and legal independence. Some have local resources and are concerned about their rational use; others have output targets and resources for meeting them. They strive to minimize overall production outlays. An obligatory condition should be the attainment of a single goal. In other words, the functioning of a complex must be evaluated by global criteria. At the same time, industrial units in the complex hand over a number of functions (for example, the management of fuel quality) to a centralized administration. The totality of centralized management functions forms the organizational and economic basis for transforming the enterprises making up the complex into a single production system.

Comprehensive solutions to problems in combining branch and territorial planning should be based on the specific characteristics of industry in the region and of the development and location of its main branches. The formation of regional fuel and energy complexes should be directed towards solving the following problems:

Revealing potential reserves for intensified development of the fuel and energy base through the extraction of low quality coal seams and the corresponding expansion of capacity for coal preparation;

The search for additional possibilities of increasing coal resources through more rational preparation operations;

Improved efficiency of economic ties through better method of fuel distribution, the long term assignment of suppliers, the elimination of irrational hauls and the introduction of slurry pipelines to preparation plants and thermal electric stations;

The implementation of comprehensive measures to improve the efficiency of fuel use through improvements in quality and the blending of coal delivered to thermal electric power stations;

Protecting the environment in face of increased energy block and station capacity and increases in fuel ash and sulfur content.

The orientation towards and attainment of better final results presumes proportion and balance in the complex's production elements, that is, a correspondence between the volume and structure of production and of consumption. Applied to a fuel and energy complex operating in an economic region (not necessarily an administrative one), this means that its units should cover all spheres of coal production and final consumption. Production capacities of enterprises in a complex should be balanced and meet the requirements of the element. The effective use of coal resources and high final results can be attained under such conditions.

At the level of a regional fuel and energy complex, final results are in the form of total complex output of electrical and thermal energy produced by GRES's or TETs's. Individual elements of the complex (mines and coal preparation facilities) extract, prepare and blend, and in some cases, transport coal. These production processes are technologically subordinate to the main goal, the production of electrical energy. Consideration is given to all factors assisting the most economical operation of thermal electric power stations and in general fuel economies. Under independent functioning, each enterprise solves its partial problems without taking the final goal into account.

A practical solution to the problem of reducing coal losses during production has an interbranch character. The task can be successfully handled by close cooperation with fuel consuming branches, based upon the specific conditions of electrical energy generation (capacity of energy blocks, the coal pulverizing system, the distance of coal transportation and other factors) and the fractional composition of rock mass arriving for preparation. With this approach one can determine the optimal level of ash content of the prepared product. In this case the optimality criterion is the maximum amount of electrical energy which can be obtained from a given weight unit of coal under various alternatives for its preparation, taking into account factors for its use in pulverized coal combustion.

Fuel coal production can be increased in two ways. The first, the extensive, consists of increasing the number of coal seams worked, operating mines, pits and preparation facilities. The second, the intensive, is increased production of coal resources primarily through the complete removal of the combustible mass and the reduction of losses during extraction and preparation. It permits reductions in total outlays for the production of the final product. It is 6 - 8 fold cheaper for the national economy than is additional production. Intensive methods, which are most completely used at production associations, are in correspondence with contemporary directions of technical progress -- the maximum reduction of output unit costs.

Improvements in fuel supply organization are very important for assuring the stable operation of electric power stations. Large thermal electric power stations now have an extremely large number of suppliers -- mines and preparation facilities. Thus, the Starobeshevo GRES has 80 suppliers and the Voroshilovgrad GRES, 95. With such large numbers of suppliers the qualitative characteristics of the fuel deliveried fluctuate over a very broad range. The lack of special blending installations at power stations is a very great hinderance to the stabilization of thermal conditions in boiler furnaces and reduces the reliability and operational economy of energy blocks. In a regional fuel and energy complex this problem automatically disappears, as the establishment of direct long term economic ties is one of the conditions for cooperation.

In recent time railroad transport has become a bottleneck. The total distance of transport mainlines is growing slower than the rapid increase in freight turnover. The reserves for increasing the capacity of important railroad yards and the line sections with the heaviest freight loads in the Donets economic region have been practically exhausted. The main way to solve the problem is to lay second, and in some cases, third tracks. In addition, it is important to keep in

mind that a large share of petroleum and petroleum products are now moved in pipelines. It is now also possible to transform coal into a slurry of a definite consistency and move it through a slurry pipeline system. This is of great economic importance. According to data from the MPS [Ministry of Railroads] and the All Union Scientific Research Institute for Railroad Transportation], about 75 million tons of coal are annually hauled short distances over the Donetsk Railroad. Cars are in useful movement only 2 - 3 hours daily and because of the large volume of transportation operations at stations of origin and destination, these cars are en route from 3 to 5 days.* It is known that short hauls on railroads are the most uneconomical. The creation of a slurry pipeline transportation system would make it possible to avoid them, and at the same time relieve the main rail lines of unprofitable hauls and release a considerable part of the rolling stock.

Experience in the operation of pipelines for liquid products shows that, in this case, transportation costs are reduced 2 - 3 fold. The movement of coal in the form of a slurry is also more economical than its movement on railways. A methodology for evaluating the comparative economic effectiveness of transporting coal by various means has not yet been developed, but one can confidently state that there will be a positive effect from the use of slurry systems. The experimental operation of a coal pipeline for delivering coal to the Belovo TETs in the Kuzbass is evidence. This is especially important for the Donetsk economic region, where increased transportation volume involved the construction of new railroad track and the intensification of yard and side track operations. The use of continuous, in this case hydraulic, transportation for short hauls of fuel coal becomes especially urgent due to the taut balance of labor resources. According to the same data, the introduction of just 2 or 3 slurry pipeline systems with a productivity of 250 - 300 tons per hour will make it possible to release several thousand people employed in the short hauls of freight.

With the branch principle of production organization the construction and operation of slurry systems poses a number of questions of organization and economic relations, solutions to which face known difficulties. First of these are allocating pipeline construction and operation costs to various branches, and the entire complex of operating problems. The divergence of views which arises here concerns branch benefits and ignores the national economic essentials and advisability of this form of transportation. There is basis to assert that if there is cooperation, the presence of such an element of production infrastructure would be of considerable help in improving the economic indicators of the fuel and energy complex.

The development of the methodological foundations for the formation and operation of regional fuel and energy complexes should be one of the basic contemporary tasks of economics. The following methodological points should be taken into consideration:

The establishment of long term and stable horizontal production ties between all elements of the complex;

Assuring the dynamic development of enterprises on the basis of optimal specialization and cooperation in the production of final output;

* PRAVDA 31 March 1980, SOTSIALISTICHESKAYA INDUSTRIYA 26 June 1981.

The use of production relations to assure the unity of economic interests of fuel producing and fuel consuming branches;

The creation of the most favorable conditions for maximizing the use of the combustible mass in the extracted coal.

Economic relations between enterprises in the complex can be implemented through economic contracts which set fuel quantity, quality and allowable deviations from optimal values, the delivery times and the material responsibility of parties for violating contractual conditions. Thus, the economic individuality inherent in a specific unit of the national economy, and the economic indepencence characteristic of any unit of public production are preserved within the framework of the existing management system. One should stress that an association of mines, preparation facilities and thermal electric power plants in a regional fuel and energy complex has the goal of improving the organization of industrial production in an economic region. This is based on a common final goal and assists in the further development of cost accounting relations and the more complete utilization of cost accounting principles.

The character of linkages between enterprises in a complex is manifested in the joint use of fuel resources. As a rule, their extraction, processing and use are enclosed within the framework of a production association. This is the coal for balancing enterprise production capacity to assure the quantitative indicators of final output. It is possible that some of the fuel can be sent to other power stations if, for example, there are changes in load dispatch schedules and emergency shutdowns. However, it is assumed that most of the fuel will be consumed by the complex itself.

The structure and character of a regional fuel and energy complex is affected by two types of production and economic linkages -- vertical and horizontal. Vertical linkages are branch ties determining the general technical and technological development of subordinate enterprises in accordance with a unified policy for improving production processes and completing the tasks facing the branch. Horizontal linkages are the ties within a complex directed towards the most efficient and economical production results. These two types of linkages, and consequently two management forms, supplement one another and, in the final account, assist in improving the efficiency of public production.

The following tasks should be handled in the final selection of an organizational form for a regional fuel and energy complex:

The rational combination of the positive facets of branch and territorial management;

Assurance of the most efficient and complete use of coal resources;

Determination of common final goals and ways of attaining them;

Assuring cost accounting relations and the economic interest of all production elements in the final results;

The creation of conditions for reducing environmental pollution.

To solve day to day problems arising during the operation of a fuel and energy complex a special organ, a council of enterprise directors, could be created; its activities coordinated with existing forms for managing the economy. The directors' councils' functions should, in particular, include a system for the management of fuel quality, setting the optimal level of coal quality at all stages of its production. Quality levels (ash, sulfur and volatile content, heat of combustion) should minimize the unit costs of final product for the entire complex.

The territorial-group form of fuel production and consumption organization considerably expands the possibility for the more complete extraction of coal and combustible mass: preparation, reduction of outlays for the partial quality improvements at intermediate stages, the use of thermal energy to dry coal, etc. One can therefore assert that regional fuel and energy complex management organs do not duplicate or replace branch management organs, but supplement and improve them.

The system of economic methods for managing a regional complex also includes problems such as the organization of financial and economic relations between enterprises, relations with banks and the creation of accounting systems. It is very important here to select and properly use value indicators which would completely correspond to actual labor outlays and eliminate the possibility of obtaining local advantages to the detriment of the industrial complex's general interests. In this regard it is advisable to use a system of special settlement [raschetnyye] prices instead of wholesale price list prices (within the framework of a given complex).

The basic function of settlement prices in a regional fuel and energy complex is to equalize the profitability of enterprises in different branches with very different production costs. Settlement prices are used for selling complex final output, following existing zonal rates, to pay mines for coal delivered to preparation facilities and for concentrate delivered to power stations. The provision of normal cost accounting conditions for the production activities of all enterprises in an association is basic to the mechanism of settlement prices. In this they radically differ from intrabranch settlement prices, the functions of which consist in the redistribution of profits between enterprises having different individual cost levels.

The realization of a regional fuel and energy complex's advantages as the most progressive form for territorial production organization will depend to a great extent upon the degree of perfection and objectivity in accounting for each element's proportional contribution to the final result and upon the material stimulation methods used. These problems, relating to the economic methods of management, have not yet been worked out sufficiently. The task is to create an economic mechanism for management which would give collectives of adjacent enterprises an interest in achieving the best general results.

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CSO: 1822/331

COAL

SOCIALIST PLEDGES FOR COAL EXTRACTION MADE

Donetskugol' Pledges More Coal

Kiev PRAVDA UKRAINY in Russian 8 Jan 84 p 1

/Socialist pledge by the Order of Lenin Donetskugol' Production Association for Coal Extraction for 1984: "More Coal to the Motherland"/

/Text/ Miners of the Order of Lenin Donetskugol' Production Association for Coal Extraction, carrying out the resolutions of the 26th CPSU Congress, completed their tasks for the third year of the 11th Five-Year Plan ahead of schedule. According to technical and economic indicators, they extracted 62.2 million tons of coal, which is more than 2 million tons above the plan.

Unanimously endorsing and supporting the resolutions of the December (1983) Plenum of the CPSU Central Committee, 9th Session of the 10th convocation of the USSR Supreme Soviet, completely sharing the provisions and conclusions contained in the address at the Plenum by the CPSU Central Committee secretary general, Comrade Yu.B. Andropov, workers of the association resolved not only to maintain the established pace, but to further expand their labor activity and creative initiative in realizing the program to provide fuel to the national economy.

Having taken part in the socialist competition for completing the 1984 tasks ahead of schedule, and maintaining the intiative of the leading collectives of Moscow, Leningrad, and other cities in attaining high production results, the association workers made the following pledges:

Based on the broad introduction of new equipment and technology, progressive methods of organizing labor and production, strengthening the policy of economy and thrift, improving the professional skill of miners, reinforcing planning, executive, and labor discipline, to top the target plan for labor productivity by not less than 1.5 percent, to reduce the cost of extracted coal additionally by 0.5 percent. To complete the annual plan for extracting coal ahead of schedule--by 26 December 1984, to produce 300,000 tons of coal above the plan,

including 80,000 tons by USSR Supreme Soviet election day. To ensure growth in the volume of production of consumer goods from the 1983 level by 25 percent. Strictly to keep to pledges of production delivery.

To improve use of the existing production and scientific-technical potential. To develop mine output by 103 percent, to have 42 high-production brigades, including 12 that extract 1,000 or more tons of coal a day from the breakage face and 20 high-speed heading brigades. To include 75 percent of all workers in brigade-type labor organizations. With the assistance of progressive brigade instructors, to improve production of 160 collectives of brigades and sections.

To save not less than 20 million kilowatt-hours of electricity, to reduce fuel consumption for auxiliary power by 1,000 tons of standard fuel, to reuse 35,000 tons of metal reinforcements, to reduce losses in work time by 0.5 percent. By introducing new equipment and improvements and inventions into the production process, to obtain a savings of not less than 7.8 million rubles.

To construct 114,000 square meters of living space, including 24,000 square meters in an efficient manner, provide health and recreation facilities in sanitoria, holiday homes, health centers, and pioneer camps for nearly 45,000 miners and family members; to provide all types of training for not less than 60 percent of all workers. To carry out specific measures to put miners' municipal areas and settlements into exemplary condition.

To broaden patronage assistance to the village; above allocated /meat/ resources to produce 40 tons of meat in the association fattening stations for use be the miners' public eating establishments, and to grow 42 tons of vegetables.

Miners of the Donetskugol' Association appeal to all workers of the coal industry actively to become involved in the competition for unconditional accomplishment of plan tasks and social pledges for 1984 and the Five-Year Plan in total, and thereby make a worthy contribution to the strengthening of the economic and defense might of our Motherland.

Socialist pledges were discussed and adopted at meetings of workers of the enterprises and organizations of the Donetskugol' Coal Extraction Production Association.

Krasnoarmeyskugol' 1984 Production Pledge

Kiev PRAVDA UKRAINY in Russian 10 Jan 84 pp 1,3

/Socialist pledge by workers, engineering-technical workers, and maintenance personnel of the Krasnoarmeyskugol' Production Association for 1984/

/Text/ Miners of the Krasnoarmeyskugol' Production Association, carrying out the resolutions of the 26th CPSU Congress ahead of schedule, completed the tasks of the third year of the 11th Five-Year Plan and excavated more than 800,000 tons of coal above the plan on 1 December 1983.

Unanimously endorsing and supporting the domestic and foreign policy of the Communist Party and Soviet government, responding with practical acts to the resolutions of the December (1983) Plenum of the CPSU Central Committee and 9th Session of the USSR Supreme Soviet, guided by the tasks set down in the address at the Plenum by the CPSU Central Committee secretary general, chairman of the USSR Supreme Soviet Presidium, Yu. V. Andropov, attempting to make a worthy contribution to strengthening the economy and defensive capability of the Motherland, the workers of the Association pledge in 1984 to fulfill the plan for coal extraction by 26 December, to extract an additional 100,000 tons of fuel, and to realize production above the plan by not less than 1.5 million rubles.

Based on an improvement in the technical level of production, improving use of the production capacity and mining engineering, and the broad introduction of progressive methods of labor management, improvement in the miners' professional skills, strengthening labor and production disciplines to exceed the plan in labor productivity by one percent. To reduce the planned costs of extracted coal by 0.5 percent and to save 850,000 rubles.

To bring the specific weight of coal extraction, with the assistance of mechanized systems, up to 93.9 percent. To have in operation eight integrated-mechanized faces with thousand-ton capacity and four breakage faces in thin seams with a capacity above 500 tons a day, and a brigade of breakage face miners from the Krasnolimanskaya mine, headed by V. I. Ignat'evyy, to extract in one year from one seam not less than one million tons of coal. In order to provide mines with the necessary extraction services, raise the extent of combine-processing of mine workings to 63 percent and to surpass the plan by not less than one kilometer. To increase the coverage of workers by brigade forms of organization and labor incentives up to 81 percent.

Through efficient consumption of material and energy resources, to secure savings above the established standard of 10 million kilowatt-hours of electricity, 520 tons of standard fuel, to reuse 6.5 thousand tons of metal reinforcements. By introducing new equipment, innovations, and devices into the production process, to obtain a savings of 2.8 million rubles. To reduce heavy manual labor by 0.4 percent in comparison to the planned level.

In achieving the plan for growth of collectives, construct 18,000 square meters of housing for miners, to give assistance to those who

built their own housing in building 1,800 square meter individual houses, to make capital repairs to 28,000 square meters of available housing. To carry out specific measures in the organization of public services and amenities and in planting greenery in mining towns and settlements. To improve conditions in sanatoria, holiday houses, health centers, and pioneer camps for 10,000 workers and family members.

To actively participate in realizing the Food Program. To obtain not less than 400 metric quintals of pork and to grow 500 kilograms of mushrooms in the Association's auxiliary farm. To lend assistance to kolkhozes and sovkhozes under patronage in weeding and harvesting the crops covering an area of 1,800 hectares.

We challenge the Dobropol'eugol' Production Association to socialist competition.

We assure the CPSU Central Committee and Soviet government, and the secretary general of the CPSU Central Committee and chairman of the USSR Supreme Soviet, Yu. V. Andopov personally that the workers, engineering-technical workers, and employees of the enterprises and organizations of the Production Association will do everything to successfully complete this socialist pledge for the fourth year of the 11th Five-Year Plan.

This socialist pledge was discussed and accepted at meetings of workers of the enterprises and organizations of the Krasnoarmeyskugol' Production Association /in boldface/.

Coal Industry Chairman Comments

Kiev PRAVDA UKRAINY in Russian 10 Jan 84 p 3

/Commentary by V. I. Shevtsov, chairman of the republic committee of the trade union for coal industry workers/

/Text/ Miners of the Krasnoarmeyskugol' Production Association have been achieving stable results during this Five-Year Plan. In carrying out the resolutions of the 26th CPSU Congress they have extracted almost 1.5 million tons of coal above plan since the beginning of the Five-Year Plan. The Krasnoarmeysk miners found their main reserve in improving the efficiency of using mechanized systems and increasing the load per longwall.

As is known, in the Krasnoarmeysk mines they have reached the highest level of overall mechanized extraction of coal--nearly 90 percent of the fuel comes from the "iron-equipped" longwalls. Incidentally, of the 28 composite-mechanized faces operating here 12 faces have a daily loading of 1,000 or more tons. But in the Donbass, the celebrated brigade of machine operator V. I. Ignat'yev from the Krasnolimanskaya

mine, has been extracting 2,500-3,000 tons of coal a day from a face for a long time. In total, this collective--on the right flank of the coal industry of the republic--last year extracted more than one million tons of fuel from the face. The breakage face workers from the Tsentral'naya mine, led by V. S. Volkovskiy, also made the same kind of efficient use of the brigade's coal extraction equipment. Under difficult mining conditions, it extracted an average daily load of up to 1,400 tons.

That is the uniqueness of the Krasnoarmeyskugol' Association is technical policy: to reach optimum loading levels for the newest types of extraction equipment used under the most difficult mining conditions. The work faces of a number of mines have been declared as continuously operating schools of advanced mining skills.

Such training like councils of directors of the enterprises has proved itself. The directors' council has gone many times into mines and divisions, where the situation has deteriorated to make a critical analysis of the drop in work, and to develop recommendations jointly. The directors' council are also held at the principal top mines in order to learn from the best examples of enterprises management.

In the Krasnoarmeyskugol' Association, special attention is paid to improving methods of constructing underground levels. Introduction of high-speed drives and especially union combines. The level of operations by the driving brigades is already 70 percent. Last year this permitted to complete more than five kilometers of stripping and preparatory workings above the plan. All mines have a sufficient number of breakage faces.

The Krasnoarmeyskugol' Association is one of the first in this branch to enter into competition to fulfill the 1984 tasks ahead of schedule, to maintain the intiative of progressive collectives to increase labor productivity and reduce the cost of fuel. Miners of the Ukraine have pledged to increase labor productivity by one percent over the plan and to reduce the cost of an extracted ton of coal by three kopecks. In the fourth year of the 11th Five-Year Plan they intend to extract not less than one million tons of coal above the plan.

Underground Stores

Moscow PRAVDA in Russian 7 Feb 84 p 2

/Text/ Neryungri, 6 Feb--Geologists in South-Yakutsk have begun industrial exploitation of coking coal in the Chul'makansk ore deposit. Its reserves are considerable. The raw material stores are located 30 kilometers north of the settlement of Chul'man, directly on the route of the Amur-Yakutsk highway.

Currently, the reserves of the resource base of the South-Yakutsk territorial-production complex, whose development actively influence the Baykal-Amur railway, comprise nearly one and a half billion tons of coal.

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CSO: 1822/349

COAL

SHORTCOMINGS OF UKRAINIAN SSR COAL INDUSTRY NOTED

Kiev PRAVDA UKRAINY in Russian 21 Feb 84 p 4

[Article from Ukrainian News Agency: "Improving the Coal Industry's Effectiveness"]

[Text] An enlarged meeting of the Ukrainian SSR Ministry of the Coal Industry's board, the Republic Committee of Coal Industry Workers' presidium and leading workers from production associations and combines was held in Donetsk. The subjects discussed were the results of the enterprises' production and economic activities last year and measures to insure the fulfilled of the planned assignments for this year in light of the decisions made by the December (1983) special February (1984) CPSU Central Committee Plenums, as well as the January (1984) Ukrainian Central Committee Plenum.

In the speeches made by the participants in the meeting, it was noted that the coal industry, which occupies the leading place in the republic's fuel and energy complex, is still not making complete use of its reserves and capabilities. The branch has been working unstably for a number of years and producing a significant amount of coal less than specified in the plan. The number of mines and sections that do not fulfill their assignments has increased. The situation that has arisen at enterprises in the L'vov-Volynskiy basin and in the Pavlogradugol' association, which even recently worked more stably, is causing concern.

It was mentioned at the meeting that the leaders of production associations and enterprises are not implementing the proper measures to increase the rate of mining work, use equipment more efficiently and raise the level of organization and discipline. Attention was also turned to the need for more efficient utilization of labor resources and an increase in the yield of the labor done by the workers to extract coal. Large losses of working time because of absenteeism and equipment down time are still permitted at part of the underground and open pit mines.

Criticism was directed at the leaders and specialists of scientific research and planning organizations and coal industry plants that are still not providing the miners of the Donbass [Donets Coal Basin] with enough high-productivity equipment. At the same time, it was pointed out that in individual associations the necessary monitoring is lacking, along with strict demands from the leaders for the most rapid possible mastery of new equipment that is available.

The ministry's apparatus and board, it was said at the meeting, must analyze more deeply the state of affairs at different places, improve association leadership methods and offer the associations concrete assistance, and strive to see that the assignments for the current year and the five-year plan as a whole are unconditionally fulfilled. Plans have been made to speed up the mastery of production capacities, put new levels and longwalls to use instead of ones that have been worked out, implement a program for the further re-equipping of the mines, increase the amount of coal extracted from complexly mechanized faces, and institute measures to eliminate manual labor in the auxiliary professions. Further develop must also be given to the crew type of organization and wages. The measures that have been developed provide for the provisional freeing of more than 4,000 workers this year and a labor productivity increase of 1 percent more than specified in the plan; because of this, 1 million t of coal more than called for in the annual plan will be produced.

A.P. Lyashko, chairman of the Ukrainian SSR Council of Ministers and member of the UkSSR Central Committee Politburo, also spoke at the meetings.

V.P. Mironov, candidate-member of the UkSSR Central Committee Politburo and first secretary of the Donetsk Obkom, participated in the work done at the meeting.

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CSO: 1822/300

KIRGHIZ MINERS' PLANS, OBLIGATIONS OUTLINED

Frunze SOVETSKAYA KIRGIZIYA in Russian 22 Feb 84 p 1

[Article by N. Kiselev, special correspondent, Kyzyl-Kiya: "The Miner's Supplement"]

[Text] A million tons of coal a year--the miners of Kyzyl-Kiya have reached that extraction level more than once. They reached it last year, too.

"Nor are we behind schedule this year," says I. Kolbayev, secretary of the Kyzyl-Kiyskoye Mine Administration's Party Committee. "On the contrary--we are trying to stay ahead of it."

The miners' words do not differ from their work. From the first days of January the work has been done at headlong rates. Already, 9,300 t of above-plan coal has been extracted from underground and open faces. The assignment for sending high-quality, large- and medium-class coal to consumers is being overfulfilled.

The collective at the Abshir Open Pit Mine is leading in coal extraction. The crews of V. Belousov, K. Alimov, N. Sitolenko, Yu. Arbuzov and T. Dadabayev are particularly noteworthy.

In response to the decisions of the December (1983) CPSU Central Committee Plenum Kyzyl-Kiya's miners assumed increased socialist obligations. It was decided to increase labor productivity by 1 percent above the planned figure. This means that an additional 40,000 t of coal will be extracted from the depths of the Earth during the year. Of this amount, 6,000 t were to be produced by the day of elections to the USSR Supreme Soviet. However, the Kyzyl-Kiyans worked better than they had planned, and as early as 1 February had already produced an additional 9,300 t. An improvement in the other technical and economic indicators is also expected.

The obligations have been confirmed by accurate calculations. For example, the miners planned to increase the average daily production load at the working faces and bring it up to the calculated indicator. This will result in the extraction of an additional 6,600 t of coal. Mining technology will be used more effectively during the performance of preparatory work. The yield of rock-loading machines and scraper units will be increased at the mine, and that of excavators and dump trucks at the Abshir Open Pit Mine.

The organization of the coal miners' labor is being improved in all production sections, and the combination of professions is being practiced quite widely. The use of the labor participation coefficient is contributing to a strengthening of labor discipline and an improvement in responsibility for assigned work.

The obligation to reduce coal extraction costs by 0.8 percent more than specified in the plan will result in a savings of 115,000 rubles. In their personal accounts the miners will enter 180,000 kWh of electricity, 72 t of diesel fuel and gasoline and 300 m^3 of lumber. These figures have all been substantiated. For example, in order to increase coal extraction by 40 t while reducing lumber consumption by 300 m^3, the miners will reuse wooden supports and replace them with metal and concrete where possible. The plan also involves the reusing of repaired metal arches. Plans have also been made to use modern types of supports to "catch" the rock in underground workings to the extent of 3,500 running meters and to drive more than 2,100 running meters of main underground shafts with metal supports.

There is yet another fact that testifies that the miners are actively introducing reserves for increasing labor productivity and reducing expenditures. In Section Four of the Leninskiy Komsomol Mine, the seam slopes steeply. This caused a lot of difficulty, particularly as far as mechanized extraction was concerned. However, the miners again found a way out. They began to extract coal with the help of a cutting combine. The machine is functioning well in its new role. A. Kapotov's crew of miners has mastered this innovation.

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CSO: 1822/300

MINING IN YAKUTSK ASSR DESCRIBED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 29 Feb 84 p 1

[Article by A. Nemchenko, Party bureau, Severovostokugol' association: "The Crews Set the Tone"]

[Text] I was at the Kadykchanskaya Mine and the Tal-Yuryakh open pit mine on those days when the special Plenum of the Party's Central Committee was convened in Moscow. The mood of the people and their responses to the speech given by CPSU Central Committee General Secretary K.U. Chernenko confirmed that the party's summons--to achieve an above-plan increase in labor productivity of 1 percent and an additional reduction in output production costs of 0.5 percent--is regarded here as a battle plan for execution. It was talked about in naryadnyye [translation unknown] and in conferences where collective agreements were being made.

An above-plan increase of 1 percent in labor productivity in the Severovostokugol' association means 200,000 t of coal. Today every collective already knows to what limit and until what date it must push itself. The first landmark is the successful fulfillment of the obligations assumed in honor of the elections to the USSR Supreme Soviet.

At the Kadykchanskaya, the year began badly: in January they were behind by almost as much coal as they had pledged in their pre-election obligations. The reasons for this were that they had moved into a region that was very complicated geologically and the coal was being mined in small, remote sections.

However, as early as the middle of February the mine had paid off its debt. There is now no doubt that the miners will deliver their 1,000 t of above-plan coal by 4 March. Examples of highly productive labor there are I. Sokolovskiy's extraction crew and the cutting collectives led by V. Yesipenko, G. Tsopanov and K. Ivanov.

Right now, the miners at the Tal-Yuryakh open pit mine have 10,000 t of above-plan coal to their credit. It is not hard to see why: there the crews are strong, the people's qualifications are the very highest, and they know their equipment excellently.

I. Bitel', bearer of the Order of the Labor Red Banner, has been working at the mine for more than 20 years. Using an EKG-4.6 excavator, his crew exceeds the

norm every day. Excellent masters of their craft also work in A. Kucher's crew. When they need to, they do stripping work; when they need to, they dig coal or unload it from the storage facilities. Even during the severest Kolyma frosts--and 50° of frost is no rarity there--vehicles loaded with coal come out of the pit.

More and more mining collectives are changing over to crew contracts. The workers themselves were the first to see the advantages of that method. Although, for example, B. Rogoza's crew at the Veringovskaya Mine was one of the laggards not too long ago, last year its daily production averaged 1,319 t.

These successes are weighty because the word of the working collective itself has become weighty. The crew councils participate in discussions of the work program, the development of measures to increase production efficiency and improve the organization of labor, and the uncovering of reserves to increase labor productivity. Their role in strengthening labor discipline is particularly noteworthy: in the crews of working face workers and cutters there are now no transgressors or shirkers.

The crew is also the first assistant in the re-equipping of production. I remember how critically the miners regarded the cutting combines: "It's all the same, you see, because they don't work for us." Now, however, A. Obukhov's crew at the Anadyrskaya Mine has only to test a coal-extraction combine and a delegation of workers from the Kadykchanskaya arrives to adopt their methods. Under the complicated geological conditions that are present in the Kadykchanskaya Mine, combines should actually give a good account of themselves. The association's engineering services are now developing a plan to use them at the working faces in combination with the chamber system of mining.

At the Veringovskaya Mine, coal extraction is being done completely with complexes these days. They are also being used everywhere possible at the Anadyrskaya Mine. The miners of Kolyma and Chukotka, as they say, are voting for the new equipment with both hands. The people understand that this does not mean only high labor productivity, but working under better, more comfortable and safer conditions. In the final account, it is not only in the interest of the State, but also in the interest of the working man himself, which was and is the party's main concern, as was again emphasized at the special CPSU Central Committee Plenum.

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CSO: 1822/300

PROGRAM FOR IMPROVING MINING IN LISICHANSK OUTLINED

Kiev PRAVDA UKRAINY in Russian 6 Mar 84 p 2

[Article by I. Kachalov, inspector, UkSSR CPSU Central Committee, and A. Zharkikh, correspondent: "The Road to Efficiency"]

[Text] Lisichanskugol' is a young association that was created only 5 years ago. Its job was not an easy one: during the 10th Five Year Plan, of 8 mines only one--the Mine imeni Kapustin--managed to fulfill its plan. Every year the total amount of coal extracted dropped by 200,000-300,000 t. In such a situation it was not easy to turn the tide of the battle to increase coal extraction and accelerate the preparation of the underground workings. The association's specialists made a thorough analysis of the situation at each mine. A course of measures to concentrate the mining and intensify coal extraction was adopted. A great deal was done to re-equip the enterprises, enlarge the number of working faces, and expand and increase the effectiveness of capital construction. For instance, new levels began to be exploited at the Novodruzheskaya, Kremennaya and Matrosskaya Mines and the Mine imeni 60-letiye Sovetskoy Ukrainy. The rate of preparation of the workings picked up and the number of mechanized faces was increased.

In a word, the creation of a strong material and technical base laid the foundation for the successful completion of the assignments given the association. This made it possible to stop the decrease in the amount of coal extracted. In the last 2 years, the miners of Lisichansk have fulfilled their plan successfully.

The Party's call to turn the tide in the struggle for further improvement in labor productivity and a reduction in output production cost served as a new and powerful impulse in the work of the association's specialists and all its miners. On the initiative of General Director V.I. Poltavets, there began the development of an integrated program to develop the mining business, increase the loads on the coal-extraction and cutting equipment, reduce nonproductive expenditures, and improve the social and domestic conditions under which the miners work and live.

The program has nine parts: "Labor," "Production Cost," "Re-Equipping and Modernizing the Mines," "Preparatory Mining Operations," "Labor, Political and Moral Education of the Workers," "Production, Domestic, Social and Cultural Conditions of the Workers' Lives" and so on. Each area has been adjusted scientifically and examined down to the smallest detail.

For example, in the "Labor" section there is a complex of organizational and technical measures, the implementation of which will enable the miners of Lisichansk to achieve an above-plan increase of 1 percent in labor productivity. How? A group of specialists under the leadership of Production Director A.Ye. Kir'yanov is providing the economic substantiation and a clearcut program of activities. Let us say, for instance, that improving the technical level of production will make it possible to increase productivity by 0.3 percent, concentrating production will raise it 0.4 percent, and improving the organization of production and labor will contribute 0.3 percent.

Thus it is in every area. For this year as a whole, the plans are to extract 37,000 t of above-plan coal and drive 700 running meters of underground workings without increasing the number of workers.

There is no less interest in the "Production Cost" program. Calculations show that the cost of extraction of 1 t of coal will be lowered by 15 kopecks. At first glance this is not much, but overall it will make it possible to save 568,000 rubles. But how are these 15 kopecks to be saved? The program gives guidelines: it is necessary to reduce the consumption of auxiliary materials, fuel and electricity wherever possible, make more use of repeatedly recovered arch timbering, conveyor belts, cutting tools...In addition to this, there is to be a reduction in nonproductive wage expenditures and a significant reduction in the amount of unused and unnecessary equipment. Here a kopeck is saved, there half a kopeck...and it all adds up to more than half a million rubles.

In order that all these calculations take on a real form, a rigorous system for monitoring the effective use of material, labor and financial resources has been developed. The analysis of the production cost of extracted coal will be done by computers. From among the association's specialist, people have been named who are responsible for formulating the weekly operations information, entering it in the computer, processing it and disseminating the data from the computer center.

Right now at the mines there is special emphasis on increasing personal responsibility for the use of State facilities. When the norms are exceeded by any amount whatsoever, the fact is recorded in flagged documents that indicate the reasons for overconsumption, list the names of the specific guilty parties, and define measures for the elimination of the causes that make fuel more expensive. The chiefs of the extraction and cutting sections make systematic reports on the results of the work being done to lower output production costs. And at the meetings of the association's permanent production commission, even the enterprises' top leaders have to come up with answers if it seems as if enough importance is not being attached to matters of economy and savings. Thus, literally everyone--from the ordinary miners to the leading specialists--has been enlisted in the realization of the "Production Cost" program.

However, practically all the sections of the integrated program will "work" on increasing labor productivity and coal extraction and reducing expenses. An important place in it is occupied by the regeneration of working faces and the construction of new levels. The title "Cutting" covers one of the largest number of organizational and technical measures. This is understandable: the coal extraction process is heavily dependent on the speed at which the preparatory work is done. And, to put it mildly, it could be better at many coal industry enterprises in the republic.

During the last 3 years, 2.7 km of above-plan main underground shafts were drive at Lisichanskugol'. For this year the plans are to prepare 69 km of underground workings, which is significantly more than the planned figure. Most of them will be driven with the help of combines and high-speed methods.

An interesting innovation, in our opinion, is the system for planning the cutting crews' work that is stipulated in the program. What was the state of affairs before it went into effect? The collectives engaged in preparing the underground workings did not have a clearcut plan of actions. The cutters were frequently used for auxiliary or (so to speak) peripheral work. A crew is now presented with a production chart that lists the sections of main underground shafts that it is to cut. By knowing not only the total amount of work, but also the specific "points," the collective evaluates its strength and estimates beforehand where it can gain the most time.

Yet another point. It is a well-known fact that when a collective moves from one fact to another, the intensity of the cutters' labor drops sharply. Days and even weeks are lost while equipment is being assembled and prepared. How can this be avoided? At Lisichanskugol' it has been calculated that it is advisable to have small special crews for the preliminary preparation of the entry faces. Such collectives have already been set up at all the association's mines and good results are being obtained.

Among the cutting crews there has developed a one-on-one socialist competition for the best achievements. Many of them have already changed over to a collective contract and introduced personal savings accounts. A system has been developed for moral and material stimulation and an economic attitutde toward materials, equipment and electricity.

The integrated program that has been set up for the Lisichanskugol' association does not provide only for the development of coal enterprises, an increase in productivity and a reduction in the production cost of extracted fuel. It also determines the rational utilization of the income obtained as the result of the miners' highly productive and efficient labor. It projects the construction and modernization of the administrative and domestic combines, hospitals, schools, professional and technical schools, kindergartens and day nurseries. Considerable means are allocated for the improvement of the miners' social and domestic living conditions. This is precisely the subject covered by K.U.Chernenko CPSU Central Committee general secretary, at the February (1984) CPSU Central Committee Plenum, who emphasized that there should be a discussion of the question of how all the means and resources that will be obtained because of this should be directed to the improvement of the Soviet people's working and living conditions.

On the basis of developments by the association's specialists, the mines are creating their own special-purpose programs that allow for their own conditions and capabilities. We talked with many engineers, technician and ordinary miners. They all mentioned the qualitatively new approach to the solution of problems that have become urgent in the coal industry. The matters of paramount importance are not, they said, individual records and isolated incidents of very high labor productivity, but a thoughtful, scrupulously calculated mass struggle for more coal. Clearly planned work makes it possible to obtain more output today and to have a better view of the future.

"Speaking honestly, we at first thought that this was just a regular, short-term campaign. Just a few measures we would have to implement," acknowledged V.P. Kryuchkov, the chief engineer at the Mine imeni 60-letiye Sovetskoy Ukrainy. "But now we have studied the overall developments more thoroughly, and gone deeper into this important matter, so we have come to understand that this is the most rational way to increase coal extraction and improve the other work indicators of coal enterprises. Of course, there was a lot to do. We included all the services in the creation of special-purpose programs."

At the December (1983) Plenum of CPSU Central Committee it was mentioned that every labor collective should know with total clarity what ways, means and methods should be used to achieve fulfillment of the high assignments for increasing labor productivity and save all kinds of resources and materials, as well as electricity. Many things have been carefully weighed and taken into consideration in the Lisichansk miners' integrated program. This does not mean, of course, that there are no more possibilities for searching out additional production reserves. Scientifically substantiated measures will still contribute to even greater initiative on the part of the workers and give purposefulness to socialist competition.

Party organizations are taking an active part in the development and realization of the contemplated plans. The Lisichansk Gorkom of the CP Ukraine has set up a rigorous system of ideological support for the introduction of these programs.

"We are acting in close contact with the association's technical staff," says B.V. Artemov, second secretary of the party gorkom. "We are directing its efforts toward the solution of the most important key problems and helping the association's specialists look at their business from both the party and state viewpoints."

Personal responsibility for the practical implementation of all the points in the program has been placed on all the communists in the coal association's ranks. The leading specialists report on the realization of the special-purpose measures. The party committee, together with representatives from the gorkom, listen to these reports systematically, make operational decisions, and monitor their implementation.

The mine's party committees have made substantial changes in their own working plans. In order to intensify the monitoring of the introduction of the special-purpose programs, reports from the chief specialists, section chiefs and crew leaders are heard more often. Although before this period the chief

engineer, for example, reported on the course of the preparation of the underground workings and equipment use once or twice a year, he now gives a full picture of the realization of the "Cutting," "Re-Equipping and Modernizing the Mines," "Preparatory Mining Operations" and "Underground Workings" programs quite frequently. This enables the party committee and the entire primary party organization to have a more active effect on the development of this mining business.

The successful realization of the association's integrated program and the enterprises' special-purpose programs will enable the Lisichansk miners not only to preserve the production rate that has now been achieved, but also to increase considerably the amount of fuel extracted. The payment of the debt formulated at the beginning of the 11th Five-Year Plan, followed by the unconditional fulfillment of the planned assignments is the goal at which the efforts of specialists and the entire large collective of the Lisichanskugol' association are directed.

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COAL EXTRACTION EQUIPMENT PRODUCTION PROBLEMS SOLVED

Moscow IZVESTIYA in Russian 27 Mar 84 p 3

[Article: "A Lesson for the Future"]

[Text] Last year the USSR Committee of People's Control discovered serious deficiencies in the organization of the series production of new, highly productive equipment complexes for the extraction of coal from thin seams and seams with complicated geological conditions. USSR Minugleprom's [Ministry of the Coal Industry] board discussed the materials generated by the inspection. Disciplinary proceedings were instituted against the officials who allowed the lag in the production of the new types of mechanized complexes. Measures were worked out that made it possible to accelerate the series output of this highly productive coal-extraction equipment at the ministry's enterprises.

The Kamenka machine-building plant put 320 units of new metalworking equipment into operation, including a large number of machine tools with digital programmed control, special and aggregate machine tools, flow lines and complexly mechanized sections. The production of complicated and highly accurate hydraulic equipment was organized and the machine tool operators who maintain this complicated and highly productive equipment were brought up to full strength and trained.

Because of the introduction of additional living quarters, the number of personnel was increased to 300. All of this contributed to the fact that last year the Kamenka plant overfulfilled its plan for output realization, provided a 39 percent increase in production output and, in the last half of the year, manufactured 20 new complexes for the extraction of coal from thin seams.

Analogous work on preparations for series production has also been done at other enterprises. The Druzhkovka plant, for example, produced nine complexes last year and mastered the production of supports for seams with complicated geological conditions. The Kargormash association produced seven new types of support for working coal seams.

According to reports from the Kamenka and Druzhkovka City Committees of People's Control, after the inspection the indicators for fulfilling the state plans improved at the plants, along with the status of production and labor discipline.

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NEW ORGANIZATION OF LABOR FOR CUTTING CREWS PRAISED

Kiev PRAVDA UKRAINY in Russian 4 Apr 84 p 2

[Article by V. Plyuvaka, cutting crew chief, Voroshilovgradskaya Mine No 1, Voroshilovgradugol' association: "The Cutter's Production Chart"]

[Text] One can frequently still hear criticism directed at cutters: they cannot manage, it is said, to prepare underground workings, and their rates of advancement toward nature's storehouses are low. Therefore, not enough coal is being extracted. One cannot help but agree with this. Actually, we frequently turn out to be in great debt to those who are directly engaged in extracting fuel.

However, cutting collectives also need constant attention and moral and material support. Unfortunately, at many mines our brother is, as before, in the position of a stepchild. Understandably, the extraction of coal is the final result. And the emphasis is always placed on that. However, producing coal without auxiliary operations--preparatory work, in particular--is impossible. Everyone understands this, but no one is occupying himself seriously with the problems involved in cutting.

Our present bane is that there is no clearcut future planning for the crews' work. This is how it turns out: a collective prepares a "point," but where it will be working tomorrow or the day after that, it does not know. Its further fate is sometimes determined in an unplanned order, or it is left without anything to do, or somewhere an acute need for people has arisen.

I will present an example from the life of our cutting crew. Last year we prepared more than 3,000 running meters of main underground shafts. The average cutting rate was 320 m. One would think that it is enough to consolidate what you have done and proceed. Nevertheless, such indicators do not satisfy us. More likely, it is not the indicators themselves but the methods used to achieve them. Why?

Some months we advanced 500-600 m with the help of a 4PP-2 combine, in others we did not do more than 150 m and turned out to be among the laggers. There were, unfortunately, many of these low-productivity periods. This creates a sense of instability in the collective and engenders among the cutters a lack of confidence in their work, and sometimes even despondency.

This does not happen just with us. Many cutting collectives, armed with generally good equipment, work unstably, moving from euphoria to depression. This is because, as I have already stated, until now we have not had a harmonious system and specific paths have not been defined for the crews.

The first promising work plans for cutting crews were introduced in the Lisichanskugol' association. They were more or less a component part of integrated, special-purpose programs that were developed by that association's specialists. The so-called "production charts" created by them are being used extensively by coal enterprises.

We, also, are already working according to such charts. It is convenient and advantageous. At the end of last year, our crew had defined for it its specific itinerary for preparing underground workings, and the amounts and periods for the upcoming work were indicated. This form of production organization enables us to distribute our forces better, make estimates, and obtain the greatest time gain wherever possible.

For example, we drove the eastern drainage drift. According to the production chart, it had to be finished in 3 months. We did it in 2 months and advanced 420 m. This enabled us to begin driving the fringe haulage drift a month earlier than scheduled.

Right now we know that before the end of the year, we will have to change from face to face three times. This means unavoidable losses: we will be behind at least a month. However, we have this time in reserve, and we will pick up the rate confidently.

It is important to be ready for anything that is unexpected. It is necessary to know, so to say, one's own strength reserves. The production chart helps to create that reserve and orient it in on the whole year. Taking this fact into consideration, we also assumed the obligation to prepare at least 3.5 km of underground workings with large cross-sections. Since the beginning of the year we have already done 750 m.

The collective is now working amicably and confidently. Having a specific goal in front of us, we developed an active labor rivalry for the highest labor productivity. Team Leaders Nikolay Yanchuk, Viktor Pazir, Aleksey Ovsyannikov and Stanislav Dudov are skillfully organizing clearcut, uninterrupted work. Machinist Aleksey Klyuchnikov has a more attentive attitude toward his combine and Technician Gennadiy Zakharov is "curing" it more thoughtfully. Even young cutters like Viktor Lyudikov and Ivan Korneyev have become more collected and are doing their assigned tasks more energetically.

The crews of I. Shubin, V. Filippov, A. Litvinov and A. Storozhenko are working with production charts in our mine. They, also, are achieving good results. Thanks to this, of the six new longwalls that were planned for the year, one is already in use and two more have been cut out completely. In addition, 60 m of above-plan underground workings have been driven

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CREW LEADER DESCRIBES NEW WORKING METHODS, GOALS

Kiev PRAVDA UKRAINY in Russian 4 Apr 84 p 2

[Article by V. Sokolov, Hero of Socialist Labor, cutting crew leader, Mine imeni Chelyuskintsi, Donetskugol' production association: "Without Rock There Is No Coal"]

[Text] Unless a front of preparatory work is done ahead of time, we cannot count on the stable, high-productivity extraction of coal. That is the literal truth. Nevertheless, last year several mines in our association were not able to cope with the plan and their obligations solely because the cutters let them down. It is bad when one forgets that without rock there will be no coal.

Driving 200-350 running meters of preparatory workings per month became the norm for our crew. We are still working at a rapid rate after 15 years. In this we are assisted by the very newest equipment (a highly productive GPK combine), a clearcut organization of labor and well-formulated innovative work. High-speed cutting depends, above all, on maximum concentration and mechanization of the underground production work. In order to achieve high intensification of the production processes in the comparatively small area at the face being prepared, we first had to retrain our personnel and achieve complete interchangeability.

It was not easy to get everyone--particularly the experienced cutters, who in the past were expert at one or two operations--to agree to this reorganization. It was even more difficult for the young production workers to become expert at everything. In order to master drilling and blasting or an electrician's job and have the right to do the work, many of them had to sit behind a desk at the evening school and then, even with their certificates, complete special courses at the educational combine.

The use of the coefficient of labor participation was also of great assistance. At a working meeting of the entire crew, a council was elected that consisted of team leaders, the profgruporg [possibly union group organizer] and the miners with the best qualifications. The mining foreman, together with his team leaders, compiles a report for each shift. On the basis of the data in the order book, I--as the crew chief--excerpt the material and, after summing up the results, take them to the crew council. At the end of each month we determine the labor participation coefficient for each mechanic. This practice increased noticeably the role of the mining foreman as the organizer of the work on his

shift, as well as the role of the team leaders, helped get the actual socialist competition going and avoid wage-leveling factors during the integrated organization of the work, and forced everyone to work on raising his own professional level and to observe strict labor and production discipline.

Of extremely valuable help to the crew was the planned work schedule that was proposed by the economists in the mine's NOT [Scientific Organization of Labor] Service. Although the multicyclic schedule that we have been using for a long time determines the strategy, so to speak, the planned work schedule determines the cutting work tactics. At a face not everything goes as smoothly as it appears on paper, in a schedule, so if we run into difficulties, the planned work schedule comes to our rescue. In addition to a clearcut distribution of duties among team members, depending on the situation that has arisen, the planned work schedule provides for interaction and mutual assistance. If something unforeseen in the schedule happens--the seam narrows because of a rock interlayer or water breaks through at the face--the planned work schedule immediately "prompts" us on how to adjust the organization of the team members' work and who should replace someone or help his comrade. On the other hand, the planned work schedule enables the mine inspector's representatives to follow the course of the work and, in case of deviation from the schedule, to intervene in the process effectively.

Right now, when a Republic School of Progressive Experience for the High-Speed Cutting of Preparatory Workings has been established on the basis of our crew, the first thing to which its numerous participants turn their attention is the fact that it is as if every one of us in the crew is an economist at his working place. Actually, for literally every operation that is part of the production cycle, we have found our reserves and placed them at the service of the production process.

The rock mass at the face is hauled away by a 1PNB-2 rock-loading machine that has been improved by our skillful crew members. In connection with this, we have also assembled "marching tool kit" (in order to have everything at hand that is needed to repair and adjust our equipment). The crew's innovators have also improved the 1LT-80 belt conveyor.

The member's of E.A. Snamikhin's repair team have built an end reloader that is an original device that is now being used to eliminate idle time that previously occurred because of the lag in the operation of the conveyor line, which could not keep up with the rapid advance of the face. Yet another innovation at the face catches our guests' attention. When blasting takes place at the face, the supporting timbers are frequently dislodged. Because of this, we previously set up temporary supports directly in front of the face. This cost us up to an hour and a half for each cycle. On the recommendations of the scientists at DonUGI [Donets Scientific Research Institute of Coal] we changed over to the use of a new type of anchored support. It is more stable and reliable.

We cooperate closely with the complexly mechanized crew of Section No 3 that is led by V.V. Vorob'yev. We have concluded an agreement with it about a socialist competition. For the mechanics in this crew we will prepare a clean front

and help them deliver the materials. They, in turn, will length the conveyor line for it. Thanks to this mutual assistance, V.V. Vorob'yev's crew managed its coal-extraction plan successfully last year and our collective drove about 2 km of underground workings, supply the diggers with a completely clean face line.

Having entered the competition with the motto "Donetsk Above-Plan Percent of Labor Productivity and Half-Percent Reduction in Production Costs--Because of Progressive Experience, New Equipment and Progressive Technology!" our collective assumed an obligation to drive 3,000 running meters of workings during the year and complete our annual assignment by 10 December. Having weighed its reserves, the crew decided to increase labor productivity by 1.5 percent, which will provide 5.1 running meters of workings per month for each member of the crew, as against the planned figure of 3.2 m. Fuel production cost will be reduced by 0.5 percent. By the repeated use of lumber and metal timbering alone, we will save 2,000 rubles, and thanks to the introduction of innovators' suggestions we will save 20,000 rubles of State funds.

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COAL EXTRACTION RECORD NOTED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 Apr 84 p 1

[Article by G. Dorofeyev, special correspondent, Krasnoarmeysk, Donetsk Oblast: "Yet Another High Mark"]

[Text] The miners of the Krasnoarmeyskugol' production association's Krasnolimanskaya Mine observed the labor holiday like shock workers. For the first time in the entire history of coal production in this republic, V. Ignat'yev's crew sent to the surface 10,513 t of coal from a single longwall in 1 day.

This record extraction at the mine was no accident and not just an isolated episode. For many years this collective has been setting the tone of socialist competitions. Right now the miners from Krasnolimanskiy Rayon are preparing a worthy greeting for the 50th anniversary of the Stakhanovite movement. V. Ignat'yev's crew is well known not only in the Donbass [Donets Coal Basin], but also throughout the branch. Last year that collective went over the million-ton mark in 11 months and 6 days. Labor productivity reached 700 t per worker per month, which is several times greater than the established norm. This year the collective set for itself the goal of securing the success it had achieved. In March it moved to a new longwall that had been prepared with due consideration for a record extraction figure.

Early on the morning of 21 April when the extraction shift went down into the mine, everyone awaited the first reports impatiently. First one band was removed, then a second...and suddenly there was a hitch: the conveyor shut down, because the machinery could not take the load. This type of trouble usually takes several hours to fix, but that day it was done in 25 minutes. M. Sakh's section worked with miraculous efficiency. By the end of the shift, those lost minutes had been made up. The first extraction section had made a good start: it removed 4 bands and sent 2,600 t of coal to the surface.

M. Gordovenko's and V. Pobegaylov's extraction sections worked with the same rhythm. V. Smol's section finished the labor watch. The start was good and the finish was successful. The people of Krasnolimanskiy Rayon greeted their heroes with music, flowers and smiles. In 1 day they had extracted almost twice the amount of coal that the mine's entire collective extracts in that amount of time. The crew pushed a 300-m wall back 10 m, and the combine

removed a strip with a total length of 8 km. This is the most ever done by miners under underground extraction conditions.

A meeting was held at the mine on the occasion of the great labor victory of V. Ignat'yev's crew. The crew leader stepped forward in the name of his comrades. He asserted that the collective would not give up its position and would extract 1 million t of coal this year. These were not empty words, either. In less than 4 months the crew has already sent 319,000 t to the surface, including more than 40,000 t more than specified in the plan.

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METHODS USED TO EXTRACT RECORD AMOUNT OF COAL EXPLAINED

Kiev PRAVDA UKRAINY in Russian 24 Apr 84 p 1

[Article by N. Ladanovskiy, correspondent, Donetsk Oblast: "Record Production"]

[Text] The crew of mechanics from the Krasnoarmeyskugol' production association Krasnolimanskaya Mine that is led by USSR State Prize Laureate V.I. Ignat'yev is famous in the Donbass [Donets Coal Basin], and it greeted the 114th anniversary of Vladimir Il'ich Lenin's birthday with an outstanding labor achievement. On 21 April, in 1 day, it sent 10,513 t of coal to the surface from a 300-m longwall! No one in the coal industry had ever before achieved such a production load on a single face.

How did the masters of the "big coal" achieve such a record output? V.I. Ignat'yev, the leader of a crew of working face workers at the Krasnolimanskaya mine, told our correspondent about it.

"By Vladimir Il'ich Lenin's birthday, our collective had gotten itself into a special frame of mind. We wanted to mark this significant date in the life of our country and the entire Soviet people with inspired and productive labor.

"We confirmed our plan with technical engineering calculations. In order to increase the load on the powerful, standardized KM-87 complex, we first--with the help of specialists from the Gorlovka Machine-Building Plant imeni Kirov--replaced the gear wheels in the feed unit's reduction gear, which made it possible to increase the coal-removal unit's speed to 1 m per minute. As a result, the combine broke coal off the longwall at the rate of 5.5 m per minute. In order to insure uninterrupted, accurate work on the longwall, we replaced the hauling chain in the entire conveyor chain of the SP-87 scraper conveyor. The mine's specialists increased the speed of the skip hoist from 11 to 12 m per second, which increased its carrying capacity.

"The mine's entire collective followed our day of shock labor duty attentively. And we completed it with honor. The mine's daily plan is 6,800 t (our crew's plan is 3,500 t), and we managed to send 10,513 t to the surface. By doing

this, we more or less passed a serious test of endurance, resourcefulness and a high degree of professional skill. We are confident that this year we will extract at least a million tons of coal from the longwall."

In the first quarter, the crew has already sent up about 300,000 t of coal for this nation's use.

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COAL

COKE SUPPLY PROBLEMS REVEALED

Moscow PRAVDA in Russian 26 Apr 84 p 2

/Article by Stanislav Prokopchuk and Vitaliy Cherkasov in the column: "Economic Review": "'Food' for the Blast Furnaces"/

/Text/ "Please hurry up unloading the pipes...," "The newspapers will need to intervene... ." Many letters and telegrams with similar content come to the editor of PRAVDA and to correspondents in the Donbass and Dnieper basins. A considerable portion of them are about the interruption in delivery of goods from metallurgical plants in the Ukraine. The most important branch of the national economy of the Ukraine is still undergoing hard times. One of the reasons for the situation that has been created is trouble in operations of the coke by-products industry, which has placed blast furnaces on starvation rations.

Many metallurgists complain about the shortage of coke. Around the topic of "Food" for blast furnace shops participants of the various meetings and selective roll-calls engage in strenuous combat. Of course! Production owed by the subdivision, which incidentally produces nearly half of all the coke in the country, exceeded 100,000 tons. But without coke there can be no pig iron or steel. And what about coking gas and other chemical products (there are more than a hundred brands)--the so-called "by-products" of the coke manufacture? They will remain an irreplaceable raw material for some time to come for non-ferrous metallurgy and power engineering, for the manufacture of fertilizers, lacquers and paints, and solvents.

The irregularities at the coke by-product plants inevitably are echoed by disturbances in production in related enterprises that depend on operation of the coke by-products industry.

However, the causes here are not only within this branch of industry. Of course, today it is easier to place all the blame on UkSSR Minchermet /Ukrainian SSR Ministry of Ferrous Metallurgy/ than on its subordinate divisions for the many "family" problems. But nevertheless, one must look deeper to find the root of the current poor operation of the coke by-products industry.

THERE IS COAL, BUT WHAT KIND?

The batteries of Avdeyevskiy Koksokhim /coking and chemical plants/ constructed in a kilometer-long line, are seemingly endless. Their demands are great. Every day, seven to eight shipments of coal are needed.

"Various grades and qualities are used" noted the chief of the enterprise's technical department, A. Kvasov. "Lean and gas, but mainly caking coal."

Many readers know that not all coal is suitable for obtaining coke. The technology of layer coking was designed to make coke from raw materials with a predominance of caking coals in the stock. And in exactly determined proportions.

Blast furnaces keenly react to coke made from poor-quality coal. The furnaces work with difficulty, and lengthen the melting process. Such coke is more sulfurous, has a higher ask content, and is less firm. The blast furnace attendants call it "dust."

In recent years, blast furnace operators had to suffer more often because of poor-quality stock. But, as they say, when there is nothing better, anything with fins is fish. You cannot be expected to run slow for days, when a fire could hardly be maintained in the furnace. In fact, sometimes even coke originating from batches with only half of caking tendency were permitted. This is the minimum limit, in the opinion of specialists. Due to the low quality of stock, labor productivity, profitability, and capital productivity of the coking by-products enterprises have been decreasing from year to year.

We will attempt to determine the sources of this arryhythmia in the sub-branch. Until the 1970's coking by-products plants in the republic operated on Donets coals. It was a good raw material and the sources were nearby. It was a sin to work eratically and inefficiently. But the most valuable coking coals, occurring in the upper layers, were exhausted. But the deeper coals, at that time, could not be reached without reconstruction. And the blast furnaces still needed raw materials! More resources could have been expended then to work new strata and mines with excellent caking coal. To do this, resources that go to subsidize unprofitable shafts with reserves of power-generating coal would have to be more actively drawn. But many power stations and boilers are converting to gas. In conjunction with this, today, in the stores and settling tanks of enrichment mills of Minugleprom /UkSSR Ministry of the Coal Industry/ up to six million tons of power-generating coal are stored.

To eliminate this imbalance in stock for Ukrkoks /Ukraine Coke Plant/ it was decided to supply it from Karaganda, Vorkuta, and Siberia. Today hundreds of shipments of coal, which was "golden" value for the state,

cover a distance of a thousand kilometers in order to fulfill nearly a quarter of the need for stock for the Ukranian coke by-products industry. The great difficultires in unloading the cars in winter requires construction of additional warehouses to increase reserves of the fuel.

Moreover, coals of other basins cannot equivalently replace the caking coals from the Donbass. We have to be concerned not only with the decline in stock of required coke-formers, but also with the decline in their properties. The effects are deplorable: production flow is disrupted, metallurgical stock is degraded, and coke losses are increased.

There is, however, an experiment that shows excellent "food" for the blast furnaces can be baked even from the high-ash and water-logged coal of the Lvov-Volynsk basin. In the plant imeni Ordzhonikidze, located in Dneprodzerzhinsk, more than 80 percent of the coke produced carries the State Emblem of Quality.

"Here, preparation of coking stock is becoming not only a science, but an art," said the plant's director, Hero of Socialist Labor P. Vlasov.

In order to obtain a good stock, we have been able to manipulate existing brands of coal in our stores to achieve the necessary proportions. For help we have called upon precise weighing instruments. The mass is thoroughly mixed and is heat treated.

Of course, this requires additional effort by the collective, and much resources for reconstruction and equipment modernization, especially for heat treating the water-logged gas coals. But it is worth it. The invested time is remunerated by the plant's smooth operation and high profits due to /good/ quality. But now this is puzzling—is it not this positive experiment taking too long to be put into practice by domestic enterprises?

STRANGE TACTICS

The average "age" of the coking batteries continues to increase. Over the last ten years the specific weight of production by the coking batteries, with a service life of more than 20 years, has grown from 16 to 47 percent. Today, expenditures for routine repairs exceed 20 million rubles, which has doubled.

Naturally, neither the Union nor republic ministries are sitting idly by. Much has been done, and is being done, to put the sub-branch in order. But the effectiveness of measures would have been far more appreciable if these departments had acted more energetically, not losing so much time on paperwork. In order to appear better, these departments and the branch Ukrgipromez Institute on one hand lowered

the estimated specific consumption of coke for making pig iron by 5-10 percent but on the other hand in recent years they established excessive, frequently unrealistic annual plans for producing "Food" for the blast furnaces.

So, with one stroke of the pen they solve problems of both the production of and demand for coke. An illusion of well-being is created. The plan is achieved "at any price," i.e., with speeded-up machine operations. Only an extremely wasteful supervisor conducts business in such a fashion.

An analysis conducted by scientists from Kharkov revealed: In recent years plans for coke production were, as a rule, higher than the design capacity of the batteries. Plus the endless additional tasks. They forced the coke by-products plants to work under extreme conditions, and to reduce the amount of maintenance and the time for preventive maintenance inspections. As a result, depletion of basic resources was accelerated, there were repeated carry-overs in periods when the worn-out machines—kept in working condition at a cost of vast expenditures of equipment and labor resources--were removed from service. It is sufficient to say that half of the personnel of the coke by-products plants are engaged in making repairs.

And this type of repair work is reminiscent of patching holes in the hull while the ship is underway. As a result, the quality of the coke plummets. Without well-organized, planned maintenance of the coking ovens, we will not obtain the increase in pig irons melting that is necessary to the national economy.

"We expect to secure an increase in production primarily due to the technical re-equipment of plants and restoration and modernization of equipment" says Ukranian Minister of Ferrous Metallurgy D. Galkin.

The concept is correct, but it is not easy to do. USSR Gosplan has still not fully determined its stand on the proper distribution of resources within the branch: What portion of it will go for construction of new facilities, and what part will go for maintaining the equipment in service? The minister rationally considers that there is no sense in building a new coking battery if those that are functioning "satisfactorily" are operating at half-capacity. Therefore, it is necessary to be more bold in drawing upon depreciation allowances to replace worn-out furnaces. This is cheaper and faster.

RESERVES ARE NEARBY

Clearly, there is no point in operating a battery which has lost half or more of its production capacity. Moreover, to divert concrete labor and material resources to its repair has to reduce the number of repairs for other, currently "satisfactory" batteries. Is it possible that this sorry experience in creating a state where

resuscitation is required for the first and second batteries of Krivoy Rog Kokskhim has taught anyone anything? Together, they produced 450,000 tons of coke. But in order to obtain this meager amount, they had to expend five-fold more resources on repairs than on the neighboring third through sixth batteries, which produced nearly two million tons in the same period of time. Or take the no less sad experience of those in Zaporozhye: over several years 17 million rubles were spent to repaid "sick" batteries. And what was their output? As a matter of fact, it was zero.

Having been convinced, finally, in the absurdity of similar "experiments," the old equipment was put out of service, having built in its place a more modern, powerful battery. Today it has already surpassed its design level.

Is it not better to concentrate energy and resources in realizing not the imaginary, but actual reserves for coke by-product and blast furnace production, in particular, introducing progressive technology? But even with this, all is not right. As an example, three years ago the republic Minchermet developed an entire program for improving the quality of iron ore stock. This would permit to reduce coke expenditures by 33 kilograms for each ton of pig iron, to save millions of tons of metallurgical raw materials, and free nearly 2,000 men from excruciating manual labor. However at present, many of the points of the program are still only on paper.

Take the same method of partial substitution of pulverized coal for coke in blast furnace melting. Two-years of operation of a full scale unit in the Donets Metallurgical Plant, currently the only one of its type in the country, showed: This is a promising, intelligent route to more economical use of coke. Last year, owing to progressive production decisions, the portion of coke used in melting pig iron was reduced by 19,000 tons. But this valuable experience did not step over the threshold and become disseminated outside of the enterprise.

The method of dry-quenching coke was worthy of a better fate. Two such units have been successfully operating for some time in Avdeyevka and Krivoy Rog. They not only reduced air pollution, but also permitted wise use of thermal energy. This method significantly increases the productivity of blast furnaces. But there is more: dry quenching, in the opinion of skilled workers and scientists, permits to raise the quality of coke.

Everyone is apparently "in favor" and nobody objecting, but apparently only those from Avdeyevka and Krivoy Rog will be the "monopolists" of progressive technology for a long time to come. The reason: the low activity of Minchermet in disseminating these innovations.

Methods for producing formcoke, heat treating stock before coking, and the process for partial briquetting of the stock are being slowly introduced. Ukrkoks and Minchermet are poorly coordinating work in creating and introducing new equipment, farming all of this out to the same plants. It turns out that there is first-class technology, but there are no machines based on it that could provide the necessary production. Moreover, requests for the manufacture of such machines are not even being sent to the ministries of machine-building. As a result, the state is taking the losses. According to data from the UkSSR Industrial Economics Institute, in the last eight years, 35 percent of all research in coke by-products plants has yielded no savings. But the total amount spent on these goals has amounted to tens of millions of rubles.

To be sure, in the large branches, and in others that are no less important to the national economic objectives, resources and their possibilities are not unlimited. But in long-term plans for restoring enterprises, introduction of the most modern and economical methods for obtaining and using coke must be incorporated.

With reference to objective reasons, coke by-products plants in the Ukraine were able to achieve a reduction by their enterprises in production plans for blast furnace "food." UkSSR Minchermet's plan for the current year was set at about 10 percent below design capacity.

Conditions have emerged for organizing smooth operations and accelerating technical re-equipment. Hundreds of workers collectives from other departments, which are rendering additional help in equipment, refractory materials, and machines, have come to lend a hand to the coke by-products industry. Capital investments have increased considerably.

Now much depends on the work of the sections of Mintyazhstroy /Ministry of Construction of Heavy Industry Enterprises/, Minmontazhspetsstroy /Ministry of Installation and Special Constriction Work/, Ukrkoksokhimremont, and other collectives. The fate of tomorrow's "food" for the blast furnaces is in their hands.

12304
CSO: 1822/349

UDC 622.65.012.1:658.512.6

UKRAINIAN COAL MINERS' 1984 ADDED COMMITMENTS REVIEWED

Kiev UGOL' UKRAINY in Russian No 5, May 84 pp 1-4

[Article by V. I. Shevtsov, Chairman of the Ukrainian Republic Committee of the Trade Union of Coal-Industry: "Advanced Experience and Counterplanning in the Ukraine's Coal Industry"]

[Text] The Soviet people and all the planet's progressive people are celebrating 1 May--International Workers' Solidarity Day. They are observing 1 May in a setting of a strengthening of the struggle for peace, for a bright future for mankind and for eliminating the threat of nuclear war, and against the dangerous plans of imperialism's forces. Our country's peace-loving foreign policy enjoys the approval and support of the broad international community. Soviet miners support the Communist Party's policy, which is aimed at preserving and strengthening peace and at reinforcing solidarity and friendship with the workers of all countries.

The Ukraine's coal-industry workers have adopted with great political and labor enthusiasm the decisions of the December 1983 and February and April 1984 Plenums of the CPSU Central Committee and the conclusions and principles set forth by CPSU Central Committee General Secretary K. U. Chernenko at the plenums. The miners are filled with resolve to intensify the continued struggle to perform the tasks set for the republic's industry for the fourth year of the 11th Five-Year Plan.

In striving to make a worthy contribution to supporting the national economy with fuel and to mark 1984 with highly productive shock work, miners' collectives have adopted strenuous socialist commitments. Based upon the wide introduction of integrated mechanization, progressive technology and advanced work-organization and production methods, and a reinforcement of plan, implementation and labor discipline, it is planned to mine 1 million tons of coal above the plan, obtain 500,000 tons of concentrate, and realize 60 million rubles' worth of output. The party's appeal to promote the struggle for a further rise in labor productivity and to reduce prime production costs has found wide support at all coal-industry enterprises. The collectives of 10 mines have adopted counterplans that exceed 11th Five-Year Plan goals by 667,000 tons of coal. Workers of 24 mining associations and 243 underground mines have decided to increase labor productivity 1 percent and to reduce prime costs for producing coal by 0.5 percent more than planned.

The first in the republic's industry to come out with this initiative were the underground miners of the Donetskugol' Association. They adopted a counterplan--to mine above the plan 600,000 tons of coal, to raise labor productivity 1.5 percent, to realize 8.1 million rubles' worth of output above the plan, to reduce prime production costs per ton of coal by 17 kopecks and ash content by 0.1 percent, and to save 2 million kWh of electricity and 380,000 rubles' worth of materials in 1984. Their slogan is: "Get the Donetsk 1 percent of labor productivity above the plan and the 1½-percent reduction in prime production costs through advanced experience, new equipment and progressive technology!"

The underground miners of Krasnoarmeyskugol' and Torezantratsit Associations adopted a commitment to mine above the plan 200,000 tons of coal, to increase labor productivity 1 percent, and to reduce prime production costs per ton of coal by, respectively, 10 and 12 kopecks. The Shakhterskantratsit, Makeyevugol', Donbassantratsit and Sverdlovantratsit Association collectives committed themselves to producing 100,000 tons of coal above the plan each.

The collectives of the Donetsk and Voroshilovgrad Coal-Preparation Associations adopted a counterplan--to process and produce above the plan 287,000 and 184,000 tons of coal concentrate and to raise labor productivity by 1 percent in 1984.

The importance of the labor initiatives were specially noted at the February CPSU Central Committee Plenum. "Our economy is indebted for each of its major achievements to the creative initiatives of the laboring collectives...," CPSU Central Committee General Secretary K. U. Chernenko emphasized.

Trade-union committees and economic supervisors are doing everything possible to insure that each useful initiative becomes common property and yields a benefit. Under the counterplans, the entire growth in production volume is to be obtained without increasing labor, materials, fuel or power resources. In order to carry out these exacting and strenuous plans in the republic's coal industry, large-scale political and organizational work is being performed daily among the workers by economic supervisors and trade-union committees under the supervision of party organizations to increase and employ production reserves.

The main attention is being paid to a further strengthening of labor and production discipline, to raising the activeness of socialist competition, to studying and introducing advanced methods of organizing work and operating processes, to intensifying monitoring of the quality of the output mined and produced and the economical consumption of labor and material resources at every workplace. The more rapidly these problems are solved by local economic supervisors and trade-union committees, the more meaningful the production successes.

The work of brigade councils, preventive-maintenance councils and mentors' councils at these enterprises is being promoted increasingly, and the role of workers' meetings and of standing production conferences is being raised. Ways to further expand the sphere of application of the brigade contract are being sought. The responsibility of engineers and technicians is being intensified through precision in the organization of work and in the coordination

of all production elements at work. All engineers and technicians are participating in the competition under personal creative plans.

Trade-union committees are constantly trying to see to it that the creative plan of the specialist becomes the basic form of individual competition and a component part of the commitment of the laboring collective as a whole. The valuableness of personal creative plans consists in the fact that, on the one hand, they allow the specialist to manifest his initiative and resourcefulness completely and, on the other, to determine his personal contribution to the acceleration of scientific and technical progress and the degree of his participation in the affairs of the entire collective.

In order to carry out the counterplans successfully, each enterprise must use with maximum motivation the production experience gained by the best collectives. The industry is doing much work on studying and propagating the experience of advanced collectives and innovators. A system for studying and introducing advanced experience that calls for a procedure for the conduct of this work, from the ministry to the enterprise, has been created and is in operation. It is governed by USSR Minugleprom [Ministry of Coal Industry] Standard Practices Instructions, and also by the decree of the UkSSR Minugleprom Board and the Presidium of the Ukrainian Republic Committee of Trade Union of Coal Industry Workers, "Measures for Introducing Advanced Production Experience."

Although previously it was recommended that the enterprises themselves plan this work, in recent years special programs for disseminating advanced experience have been approved, and specific experiments and the time and place of their introduction and the economic benefit are being defined. This has enabled the number of achievements of advanced workers introduced to be greatly increased. Enterprise economic supervisors and trade-union committees have become engaged objectively in this painstaking work.

The experience that is being proposed for introduction has been described more widely in the recommended programs. The 1983 plan calls for introducing at breakage operations advanced measures and methods for the labor of 27 collectives that are working highly productively. The experience of advanced production workers has been mastered in 78 mining brigades, enabling an increase in coal mining by more than 1 million tons and a saving of up to 840,000 rubles.

Experience in reaching 500,000 tons of coal per year has been mastered by four brigades, which are supervised by P. S. Negrutsa (the Underground Mine imeni Zasyad'ko of the Donetskugol' Association), V. I. Yerokhin (the Belozerskaya Underground Mine of the Dobropol'yeugol' Association), V. I. Pinchuk (the Underground Mine imeni 60-letiya SSSR of the Sverdlovantratsit Association) and I. T. Filev (the Underground Mine Vakhrushev of the Roven'kiantratsit Association), enabling a total growth in mining of 355,000 tons. The experience of advanced collectives in reaching a daily workload of 1,000 or more tons of coal per longwall has been mastered by 22 brigades, including those of A. V. Psheborskiy (the Yuzhnodonbasskaya Underground Mine No 1 of the Donetskugol' Association), M. S. Mik (the Underground Mine imeni Stakhanov of the Krasnoarmeyskugol' Association), V. S. Drozdov (the Underground Mine imeni Bazhanov of

the Makeyevugol' Association) and others. Ten brigades have mastered the experience of P. Ye. Venger, O. M. Goncharenko, A. P. Loza, V. V. Kolesnikov and S. F. Bilyk in reaching 700 or more tons per day. Twenty-eight collectives have mastered the experience of the best brigades in reaching 500 or more tons per day at thin seams.

At underground mines that are developing steep seams, the experience of the brigades of V. P. Makogon and V. V. Lysenko in achieving high workloads at tunneling-machine work faces is being studied and introduced by 8 collectives.

At developmental workings, the experience of 15 advanced collectives has been mastered by 57 brigades, providing for an increase in the amount of developmental workings prepared by more than 1.6 km and a saving of more than 300,000 rubles. Schools of advanced experience, seminars, conferences, consultations and visits by brigades, and radio and television appearances are being organized and implemented for purposes of the timely study and wide dissemination of the achievements of advanced workers at enterprises. During 1983, 854 schools of advanced experience were held at which more than 32,000 people participated, and 1,803 seminars, meetings and conferences and more than 1,000 visits of integrated brigades to other enterprises were held.

Responsible workers of UkSSR Minugleprom, associations, combines, republic and regional trade-union committees, and the Ukrainian Republic Administration of the NTO [Scientific and Technical Society] for Mining took part in the measures being executed. In most cases, topical exhibits were prepared for the seminars, conferences and school , and reviews of the scientific and technical literature and fi s were organized in order to publicize in more detail and more comprehensively the essence of the experience being reviewed.

It must be noted that those enterprises and associations at which work on the study and introduction of advanced experience has been presented well systematically achieve high production work indicators. A creative search for reserves for increasing labor productivity on the basis of the generalized and systematic dissemination of the experience of advanced mining and tunneling brigades is helping the Donetskugol', Krasnoarmeyskugol', Sverdlovantratsit, Shakhterskantratsit and Roven'kiantratsit Associations to increase production efficiency. Among those whose experience is being taught, one can name the breakage-face workers brigades of A. D. Polishchuk (of the Trudovskaya Underground Mine), B. A. Kostretskiy (the Mining Administration imeni Gazeta "Sotsialisticheskiy Donbass" of the Donetskugol' Association), V. I. Ignat'yev (the Krasnolimanskaya Underground Mine), A. I. Lyashok (the Underground Mine imeni Stakhanov of the Krasnoarmeyskugol' Association), V. S. Koval'chik (the Underground Mine 60-Letiya SSSR of the Sverdlovantratsit Association), P. Ye. Venger and V. N. Bylkov (the Vinnitskaya Underground Mine of the Shakhterskantratsit Association), and G. I. Motsak (the Underground Mine imeni Kosmonavty) and the tunnelers brigade of A. A. Overchenko (the Roven'kovskoye Mining Administration of the Roven'kiantratsit Association). All of them have been working consistently and highly productively for many years. During 1983, 19 brigades mined more than 500,000 tons or more of coal each. The collective of breakage-face mineworkers under V. I. Ignat'yev exceeded the million-ton goal for mining coal.

An average daily workload of 1,000 or more tons was provided for at 105 longwalls, and for 500 or more tons at 175 longwalls where the seams were thin. The collectives of 292 brigades proceeded with their erection of mine excavations at a rapid pace. About the same number of brigades are working highly productively also in 1984.

During 1983 the Krasnoarmeyskugol' Association mined more than 812,000 tons of coal above the plan, and the average monthly labor productivity of mineworkers was 44 7 tons, under a plan for 43.2 tons. The level of coal mining from mine faces with integrated mechanization was brought up to 94 percent, the workload per mine face since the start of the five-year plan has been increased 1.2-fold, and the share of mine-working development by continuous-miner tunneling is 64 percent. The association has 9 high-speed tunneling brigades, and 12 brigades are constantly operating with a daily workload of 1,000 or more tons of coal, 2 brigades with a workload of 700 or more tons, and 2 brigades with a workload of 500 or more tons. Thanks to fulfillment of the plan for introducing advanced experience, an economic benefit of 419,300 rubles has been obtained.

Sverdlovantratsit Association miners got positive results. They planned and successfully implemented specific measures for increasing labor productivity. Thanks to constant attention to integrated mechanization and automation of the processes of excavating and transporting coal, preparing developmental workings, and raising labor and production discipline at each workplace, labor productivity per mine worker for the association as a whole rose by 7.2 percent in 19[illegible]3 (over 1982), and in 1984 it has been brought up to 46.9 tons/month, that is, the plan has been met by 102.9 percent.

An example of a creative approach to such an important matter as integrated mechanization is the collective of the Underground Mine imeni 60-Letiya SSSR, where the level of anthracite mining with longwall miners has been brought up to 100 percent, the share of mechanized loading of rock has been increased 1.1-fold over 1982, and the speed of making developmental workings rose by 15 percent and is now 100 meters per month. Four mining brigades at the mine are now operating with an average daily workload of 1,000 or more tons per longwall, 8 with a workload of more than 500 tons. Seven tunneling brigades are preparing developmental workings at high speeds. Labor productivity per mine worker in 1983 was 51.7 tons per month, having risen by 5.9 percent over 1982's productivity. The prime cost of mining 1 ton of coal was reduced by 41 kopecks versus the plan.

Mine workers are successfully coping with fulfillment of the counterplan that they adopted for 1984, 78,500 tons of coal above the plan were mined in the first 3 months, the labor productivity plan was met 106.4 percent, and the prime cost for mining 1 ton of coal was reduced by 70 kopecks. Miners of the Donetskugol', Shakhterskantratsit, Krasnoarmeyskugol', Sverdlovantratsit and Roven'kiantratsit Associations are marching in the vanguard of the 1984 socialist competition. Donetskugol' Association workers, in fulfilling the counterplan, mined 336,400 tons of coal above the plan in the first 3 months of 1984 and increased labor productivity by 2.5 percent. The collectives of the Underground Mines imeni Gor'kiy, imeni Kalinin and imeni Zasyad'ko achieved the highest results.

In brief, the initiators are striding confidently along the chosen path and are achieving high results. They are an example for imitation, and their experience should become the property of each laboring collective of the industry. UkSSR Minugleprom, TsBNTI [Central Office for Scientific and Technical Information] and Donugi [Donetsk Scientific-Research Coal Institute] have now developed appropriate recommendations for 1984 and sent them to production associations and enterprises.

Along with the positive work by many laboring collectives of studying and disseminating advanced experience and valuable initiatives, there are still some economic supervisors and trade-union committees of mines and of the Dzerzhinskugol', Voroshilovgradugol', Pervomayskugol' and Antratsit Associations that do not pay enough attention to introducing the achievements of advanced workers and do not use their experience at work as one of the main reserves for raising production effectiveness. These associations worked poorly in 1983 and continue to lag behind today.

In some associations, attention to developing socialist competition to achieve a daily workload of 1,000 tons of coal per mine face has waned. The number of brigades that are operating with a 1,000-ton workload and more has been reduced versus 1981 in the Selidovugol', Krasnodonugol', Oktyabr'ugol' and Pervomayskugol' Associations. The average monthly pace of doing stripping and making developmental workings has been reduced at the Selidovugol' Association by 17.8 meters, Oktyabr'ugol' Association by 6.3 meters, Voroshilovgradugol' Association by 5.8 meters, and Stakhanovugol' Association by 4.3 meters. The labor productivity plan per mine worker is not being met within the Dzerzhinskugol' Association (81.9 percent), the Dobropol'yeugol' Association (96.1 percent), the Voroshilovgradugol' Association (94.7 percent) and the Antratsit Association (90.8 percent).

All this indicates that reserves for improving the industry's work are not few. Economic supervisors and trade-union committees have done organizational work for the industry's laboring collectives to adopt counterplans for 1984, but in essence this is only a beginning. The main task is to insure that each worker, engineer and technician at each enterprise and production association wages a persistent struggle to execute the planned measures for fulfilling counterplans, for increasing production volume, for raising labor productivity and for reducing prime production costs.

As was emphasized in the 7th AUCCTU Plenum decree, all trade-union organizations must increase the activeness of socialist competition and its mobilizing and indoctrinational role in the struggle for unconditional fulfillment of 1984 plans, the tasks of the 11th Five-Year Plan, counterplans and socialist commitments for realizing the task that was advanced by the December 1983 CPSU Central Committee Plenum--that of increasing labor productivity above the plan by 1 percent and reducing prime production costs by an added 0.5 percent.

The successful realization of counterplans and the use of advanced work methods will enable collectives not only to keep up the production pace but also to increase substantially the amount of fuel mined, reduce its prime production costs, liquidate the industry's arrears since the start of the five-year plan and create additional material-incentive funds.

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11409
CSO: 1822/325

UDC 622.26:622.232.72 "sh. im. Stakhanova"

IMPORTANCE OF DEVELOPMENT WORK STRESSED AT UKRAINIAN MINE

Kiev UGOL' UKRAINY in Russian No 5, May 84 pp 5-6

[Article by Yu. I. Samokhvalov, Chief Engineer of the Underground Mine imeni Stakhanov: "The Modern Preparation of Mine Workings Is a Guarantee of Successful Underground-Mine Operation"]

[Text] Success in the operation of a coal enterprise is determined basically by timely preparation of a line of breakage faces, which depends primarily upon fulfillment of the plan for progress in stripping and developmental excavation. The Underground Mine imeni Stakhanov of Krasnoarmeyskugol' Association went into operation in 1974. The work goes on at depths of 825-1,136 meters. The underground mine's floor is 17 km in strike and 3.5-4 km in dip, and it has been divided into several blocks, three of which are being worked. Each block is opened up by independent air-cooling and ventilation shafts, but all the blocks are joined by a single transport arterial.

Breakage operations are now being performed on seams ℓ_7 and ℓ_8. A face for seam ℓ_1 is being developed at a rapid pace. The underground mine is developing seams that are subject to sudden outbursts of coal, rock and gas, and there is danger of explosiveness from the coal dust.

At the start of the 11th Five-Year Plan, the plan for excavation work was not being carried out at the underground mine, a fact that affected negatively the steadiness of the enterprise's work. After analyzing the existing situation, the mine's administration, jointly with party, trade-union and Komsomol organizations, developed organizational and technical measures which, while raising the technical level, called for measures for improving the work order system and for intensifying labor and production discipline.

In order to improve the responsiveness of supervision, the production service for development work has been completely manned with experienced personnel, and monitoring the execution of associated tasks by tunneling brigades has been intensified. The developmental sections are under experienced and qualified engineers I. Kh. Sagarits and V. M. Steblyakov. In order to step up excavation work, tunneling brigades were reinforced, their manning increased 1.2-fold to 1.5-fold, and assignemnts to workplaces and operations were taken into account.

Special attention was paid to teaching miners at a training-course combine and at workplaces. The association's management, providing for and implementing the contemplated measures, extended help to the mine. The scientific-research sector, in making stop-watch studies of operations, helped to find production reserves that will be used later.

Much attention was paid to reequipping the excavation faces with machinery. Excavation performed by cutter-loaders reached 74 percent in 1983 versus 56.7 percent in 1982. Additionally, two 4PP-2 cutter-loaders were introduced, and tunneling machinery utilization has been greatly improved. The use of highly productive VMTs-8 fans for local ventilation has enabled excavations of great length to be made and expenditures on installing operations to be reduced by 25-30 percent, which resulted from a reduction in the number of installing operations on the equipment for the new faces. In order to improve working conditions, mobile air conditioners, which reduce air temperature by 2-3 degrees C., were introduced. A rise in the level of mechanization of auxiliary operations has played an important role. N. V. Bondarev's brigade, which came out at the mine as the initiator of speedy conduct for excavations, at first drove tunnels with the 4PP-2 continuous miner at 200 meters per month. Introduction of the 1LT-80 as a mine-face telescoping belt conveyor, with a special operating head fabricated at the mine, enabled the conveyor to be lengthened by means of the continuous miner (which is constantly connected with the operating head). When the continuous miner moves to the face, the conveyor is lengthened, and its telescoping portion is shortened.

Previously, where the mine face was moved by 3 meters, it was necessary to deliver and assemble four metal chutes for the SR-70 flight conveyor. With introduction of the 1LT-80 conveyor, labor intensiveness of the job was reduced through a lengthening of the mine-face conveyor. The installation of two 6DMK suspended monorailways enabled materials to be delivered continuously to the face over a distance of 1.5-2 km.

Performance of the set of indicated measures, along with precision in organizing work in the brigade and the correct assignment of workers, many of whom possess allied skills, enabled the monthly tunneling pace to be raised--to 250 meters in January 1983, to 360 in February and to 420 in June. The use of highly productive BMTs-8 fans for local ventilation and the KPSh-90 mobile air conditioner has enabled the production of dead-end excavations up to 1,600 meters long and the creation of conditions at the mine face that meet the established norms.

The brigades of S. V. Yermolov and A. N. Belkin, which did, respectively, 2,488 and 1,713 meters of excavation in 1983, have supported the initiative of N. V. Bondarev's brigade, and throughout the whole mine 36 percent of the excavations were made at high speed, while in 1981 the figure was only 8 percent. Challenge Red Banners of UkSSR Minugleprom and the Ukrainian Republic Committee of the Trade Union of Coal Industry Workers were awarded to the brigades of N. V. Bondarev (for the second time) and to S. V. Yermolov, for high indicators in the socialist competition among tunneling collectives in 1983.

Improvement in work organization at developmental faces, including manning of the development-work repair shift with highly skilled workers has enabled

labor productivity to grow by 6 percent, breakdowns of vehicles and machinery to be reduced and, thereby, idle time to be cut.

In 1983 the staff of tunnelers at the underground mine had been increased to 150. Special brigades for doing assembly and disassembly work, installing mated parts, and digging and equipping rooms have been manned and outfitted. Experience has indicated that the number of such brigades must be increased. Special attention should be paid to mechanizing labor-intensive work done by these brigades.

New tunneling machinery--the KSV complex for making paired excavations, the 4PP-2m continuous tunneler and the Soyuz-19 complex--have undergone an industrial check at the mine. The arterial conveyor passage produced by the complex will enable conveyor flow to be executed from the remote Nos 2 and 3 blocks to the main shaft, over which the coal is sent to the surface.

Let us note that raising the pace of penetration eliminates a number of complicating factors. The substantial depth of the mining operations required the excavation of increased cross-sectional area (16.1-19.8 or more m^2 in tunneled area) to be made. In order to eliminate the harmful effect of mine pressure, the density of supports is being increased to 2 frames per meter. Along with this, excavations must be repaired, floors must be undercut and expanded and deformed supports fully replaced up to the end of the passage. The susceptibility of the coal seams and of the sandstone to sudden outbursts necessitates that explosive hazards be forecast and special measures implemented in dangerous zones.

During the 12th Five-Year Plan, mining will be performed on horizons 1,136 and 1,240 meters, so new tasks and problems will face the enterprise collective. Improved means of ventilation and air conditioning and supports of higher load-carrying capability are necessary, and plugging for uniform distribution of mine pressure on the supports should be applied widely. Much help along these lines is being extended to the underground mine by Donugi, the Moscow Mining Institute, and the Kommunar Mining and Metallurgical Institute.

Successful execution of the program for developing mining operations in 1983 has enabled 24.6 km of workings, 1.4 km of it above the plan, to be performed, and 23.4 km of stripping and developmental excavation to be accomplished versus the 21.3 km of the plan. Six longwalls with a breakage-face length of 1,200 meters have been prepared in timely fashion, creating the prerequisites for transfer from worked-out longwalls to new ones and enabling steady operation. Thanks to this, the mine has mined more than 3 million tons of coal per year, sent out 285,600 tons of coal above the plan in 1983, mastered production capacity by 111.4 percent, and carried out the plan in all technical and economic indicators.

The challenge Red Banner of the UkSSR Council of Ministers and of Ukrsovprof [Ukrainian Republic Council of Trade Unions] was awarded to the Underground Mine imeni Stakhanov collective in the third quarter of 1983 for socialist competition results.

The mine's collective faces major tasks in 1984. In implementing the decisions of the 26th Communist Party Congress and all the subsequent CPSU Central Committee Plenums, the miners are sustaining the initiative of the oblast's leading collectives: "Get the Donetsk one percent of above-plan labor productivity and the 1½ percent of reduction in prime production costs through advanced experience, new equipment and progressive technology." This will enable the Underground Mine imeni Stakhanov collective to mine 100,000 tons of coal above the plan and to get a saving of 286,000 rubles in 1984. The underground miners' words do not disagree with the deeds--39,000 tons of coal above the plan were mined on the commitments account in the first 2 months of 1984.

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CSO: 1822/325

SELECTED SYNOPSES OF ARTICLES IN UGOL' UKRAINY, MAY 1984

Kiev UGOL' UKRAINY in Russian No 5, May 84 p 48

UDC 622.272:624.138.4

REINFORCEMENT OF UNSTABLE MINE ROCK WITH MAGNESIUM BINDER

[Synopsis of article by V. V. Vasil'yev, V. I. Levchenko and V. G. Il'yushenko in UGOL' UKRAINY No 5, 1984 pp 13-14]

[Text] The results of industrial tests on strengthening unstable rock in permanent-type workings and breakage faces with hardening agents based on magnesium binders. The technological parameters for injection. The experience of the Underground Mine imeni Zasyad'ko. 1 illustration.

UDC 622.236.232

DETERMINATION OF RESISTANCE OF NATURALLY STRESSED SANDSTONES TO DESTRUCTION BY 'KRT' CONTINUOUS MINERS

[Synopsis of article by L. D. Shmatovskiy, V. A. Strashko and V. P. Vdovichenko in UGOL' UKRAINY No 5, 1984 pp 14-15]

[Text] The results of determination of the basic indicators of the resistance of naturally stressed mine rocks to destruction during penetration of workings by KRT continuous miners. Recommendations. 1 table, 2 illustrations.

UDC 622.838.55

DEMOTHBALLING OF BLOCK THAT PROTECTS EXISTING MAINLINE WORKINGS

[Syncpsis of article by V. S. Pikhovkin and N. S. Glinchenko in UGOL' UKRAINY No 5, 1984 pp 15-16]

[Text] Test of the working of a mothballed block in the Donetskugol' Association's Underground Mine imeni Kalinin environment, with simultaneous undercutting and overcutting of existing mainline workings. 1 illustrations.

UDC 658.386.3--52.22:622.33

TRAINING A RESERVE OF SUPERVISORY COAL-INDUSTRY WORKERS

[Synopsis of article by Yu. A. Makarov and Yu. I. Rudnitskiy in UGOL' UKRAINY No 5, 1984 pp 17-18]

[Text] Analysis of training of a reserve of supervisory personnel in the Donetsk Branch of IPK [Institute for Raising Qualifications]. Proposals for improving the quality of their training.

UDC 622.333:658.5

CONSISTENCY OF SCIENTIFIC, TECHNICAL PROGRESS IN COAL INDUSTRY

[Synopsis of article by R. S. Karenov in UGOL' UKRAINY No 5, 1984 pp 18-19]

[Text] Steps in reequipping breakage faces with machinery. The consistency of scientific and technical progress in the coal industry.

UDC 622.001.2:658.314.72

NEW MACHINES--AT THE INVENTION LEVEL

[Synopsis of article by V. L. Shteynbuk, UGOL' UKRAINY No 5, 1984 p 19]

[Text] Analysis of the work of Dongiprouglemash [Donetsk State Design-Development and Experimental Coal-Machinebuilding Institute] innovators and inventors.

UDC 622.232.754

USE OF SCRAPER-SHEARER GOBBING AT LONGWALL OF EXTREMELY THIN SEAM

[Synopsis of article by K. F. Sapitskiy, I. I. Gomal' and I. N. Seleznev in UGOL' UKRAINY No 5, 1984 pp 20-21]

[Text] The design of a new scraper-shearer gobber and the technology of doing gobbing work without workers present at the working face. 4 illustrations.

UDC 622.232.8--118

'SHTREK-3' COAL-EXCAVATING INSTALLATION

[Synopsis of article by M. Ye. Gekhrid and A. I. Karlov in UGOL' UKRAINY No 5, 1984 pp 21-23]

[Text] The Shtrek-type installation created by the Gorlov Section of DONUGI [Donetsk Scientific-Research Coal Institute] for excavating coal at the faces of developmental workings on steep seams. The designation, design, area of application and test results. 1 table, 3 illustrations.

UDC 622.233.5.054.8

HYDRAULIC HAMMERS FOR VERTICAL OR INCLINED EXCAVATING IN HARD ROCKS

[Synopsis of article by A. A. Aleynikov, P. M. Peresada and I. I. Storchak in UGOL' UKRAINY No 5, 1984 pp 24-25]

[Text] The area and amounts of construction of large-diameter vertical or inclined excavations with drill-type hammering tools in the Donbass's hard rocks. The design of hydraulic hammers. Recommendations. 1 table, 2 illustrations.

UDC 622.01:621.314.21.027.3

EXPLOSION-PROOF TSV-1000/6 TRANSFORMER AT UNDERGROUND MINE IMENI GAZETA 'SOTSIALISTICHESKAYA DONBASS'

[Synopsis of article by V. M. Grushko, M. A. Nagornyy, V. V. Shilov and G. A. Leont'yev in UGOL' UKRAINY No 5, 1984 pp 25-26]

[Text] Operating principles of and test results for the TSV-1000/6 transformer at the Underground Mine imeni gazeta "Sotsialisticheskiy Donbass." 1 illustration.

UDC 622.232:658.28

REDUCTION OF FLIGHT-CONVEYOR BREAKDOWN FREQUENCY

[Synopsis of article by I. A. Grigor'yev, V. I. Alifanov and A. F. Kostyuk in UGOL' UKRAINY No 5, 1984 pp 27-28]

[Text] Analysis of the causes of flight-conveyor jamming and of methods for freeing them. A flight conveyor with lattice flight, which prevents sticking, is proposed by the Voroshilovgradugol' Association. 1 illustration, 1 reference.

UDC 622.276.52:622.234.6

SYSTEM FOR CONTROLLING AIRLIFT TURBOCOMPRESSOR STATION

[Synopsis of article by V. N. Dekanenko and O. K. Pomazan in UGOL UKRAINY No 5, 1984 pp 28-30]

[Text] Systems for regulating the consumption of air and startup of the air-lift turbocompressor station, and a system for protecting the turbocompressor from the pumpage. 1 illustration.

UDC 621.63:622.44.001.24

DETERMINATION OF POWER ON FAN SHAFT BY INDIVIDUAL-LOSSES METHOD

[Synopsis of article by A. I. Vinnik and B. S. Fal'kov in UGOL' UKRAINY No 5, 1984 pp 30-31]

[Text] Method for determining, during aerodynamic tests, the power on a fan shaft which is used during operation of a synchronous-drive fan motor in modes unlike the normal.

UDC 658.515:662-187.4

REDUCTION OF UNCOMPLETED PRODUCTION DURING ASSEMBLY OF PRECISION PAIRS

[Synopsis of article by A. A. Chichkan in UGOL' UKRAINY No 5, 1984 p 31]

[Text] Analysis of computation of reduction of uncompleted production during the assembly of precision pairs. 1 illustration.

UDC 622.4:658.284

MONITORING METHANE CONTENT IN PAIRED LONGWALLS WITH CONTROLLER'S MANAGEMENT OF VENTILATION

[Synopsis of article by D. A. Karpov, M. G. Gusev, I. I. Moskalets and K. A. Petchenko in UGOL' UKRAINY No 5, 1984 pp 32-33]

[Text] Monitoring the methane concentration in paired longwalls. Determination of the place for installing methane sensors in the longwalls, and the setting thereof. Empirical functions for computing the air consumption in each paired longwall. 1 table, 3 illustrations.

UDC 622.235.38

ANTICIPATORY DETONATION OF DEEP-HOLE CHARGES DURING PILOT TORPEDOING

[Synopsis of article by O. A. Kolesov and V. I. Stikachev in UGOL' UKRAINY No 5, 1984 pp 34-35]

[Text] The prerequisites for effective use of a moistened mix of granular urea and powdered calcium chloride as tampers for deep holes in mines with gas hazard. Anticipatory torpedoing and its advantages. 1 table, 2 illustrations.

UDC 622.831.32"313"

PRINCIPLES OF CHANGE OF PHYSICAL-PHASE PROPERTIES OF SEAMS VULNERABLE TO SHOCK, EXPLOSION DURING OVERCUTTING OR UNDERCUTTING THEREOF

[Synopsis of article by B. T. Akin'shin in UGOL' UKRAINY No 5, 1984 pp 36-38]

[Text] The scientific bases for using data about the physical-phase properties of coal (microporous and macroporous structure, moisture content and degree of water saturation) for evaluating the gas-dynamic hazard of coal seams; consistencies of their change under the influence of overcutting and undercutting of seams vulnerable to shock and explosions. 3 illustrations, 1 reference.

UDC 622.411.33:622.816

USE OF AUGER-DRILLING EXCAVATION OF COAL AT GAS-BEARING SEAMS

[Synopsis of article by N. I. Voytenko in UGOL' UKRAINY No 5, 1984 pp 38-39]

[Text] Possible directions of work of preventing accumulations of methane and friction sparks in holes during auger-drilling excavation of coal. Area of use of BShU's [auger-drilling installations]. 1 illustration.

UDC [553.94:551.24.05(043)](477.62):622.01

NATURE OF TECTONIC MOTIONS IN TERMS OF FRACTURES OF DONETSK-MAKEYEVKA REGION OF DONBASS

[Synopsis of article by O. A. Kushch in UGOL' UKRAINY No 5, 1984 pp 40-41]

[Text] Research of the peculiarities of deformation of the coal-bearing stratum of bituminous-coal sediments of the Kal'mius Toretsk hollow-basin of the Donbass. The existence of large shifts along the fractures of various scales and the necessity for considering them during exploration. 1 table, 2 illustrations.

UDC 622.01:551.735.1.333.94(477.8)

VISEYAN-STAGE COALS--PROSPECTS FOR FUTURE UNDERGROUND MINES

[Synopsis of article by B. S. Popel' and V. I. Selinnyy in UGOL' UKRAINY No 5, 1984 p 41]

[Text] The results of prospecting exploration for coal seams of Viseyan sediments performed at sectors Nos 5 and 6 of Chervonograd, sectors for future underground mines of the Ukrzapadugol' Association. Forecast geological reserves by seam.

UDC 622.268 + 281.6

CONDUCT AND SUPPORT OF WORKINGS IN TECTONIC ROCK CRUSHING ZONE

[Synopsis of article by I. V. Kachan, S. O. Reznik and V. A. Turbay in UGOL' UKRAINY No 5, 1984 pp 42-43]

[Text] Experience in making and reinforcing crosscuts under complicated mine-geology conditions at the Underground Mine imeni M. Gor'kiy of the Donetskugol' Association. Special measures for reinforcing workings, chemical anchoring and injection strengthening of rock with sand-cement solutions. 2 illustrations, 2 references.

UDC 622.7:622.333

RESPONSIVE OPERATIONAL METHOD FOR COMPUTING DRESSING INDICATORS

[Synopsis of article by A. M. Kotkin, A. A. Zolotko and G. F. Sabel'nikov in UGOL' UKRAINY No 5, 1984 pp 43-44]

[Text] A method developed by the authors that permits coal-dressing indicators to be computed responsively with a minimal amount of baseline data, for purposes of comparing variants of raw-materials bases, schemes and methods for dressing, determining qualitative and quantitative planning indicators, and solving other practical tasks. Advantages of the method. 4 tables, 1 reference.

UDC 621.928.9:622.01

EQUIPMENT FOR MPR-25 MOIST DUST TRAPPING

[Synopsis of article by A. S. Kofanov, S. V. Teterin and V. V. Bobrikov in UGOL' UKRAINE No 5, 1984 p 45]

[Text] The installation of MPR-25 equipment for moist dust trapping, the results of industrial tests at the TsOF [Central Preparation Plant] Obukhovskaya, and the specifications. 1 table, 2 illustrations.

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SEISMIC PROSPECTING FOR OIL BY CEMA

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV S E V in Russian No 1, 1984 (signed to press 19 Jan 84) pp 28-30

[Article by Aleksey Kashik and Viktor Manukov, Interneftegeofizika Coordination Center, and Yanko Yakimov, CEMA Secretariat: "International Division of Labor in Seismic Prospecting for Oil"]

[Text] At the present stage of development of petroleum geophysics in the CEMA member countries, scientific, technical and economic cooperation in the field of automated processing of any information that is obtained is of great importance. The systematic increase in the amount of primary geophysical materials about the geological structure of objects that are being studied requires a sharp increase in the capacity of the computers that are being used in order to insure the timely processing and geological interpretation of the data. In connection with the emergence of the practice of prospecting for oil deposits in more complicated geological areas, the geological observation techniques have become considerably more complex. At the same time, the data processing requirements have been raised and there has appeared a need for the creation of better algorithms and programs.

In order to carry out the assignments with which geophysics is faced--and this applies in particular to seismic prospecting, which is one of the most important geophysical methods of prospecting for gas and oil--it is necessary to unite the forces of many scientific and production collectives. Guided by this need, in 1974 the NRB [People's Republic of Bulgaria], the VNR [Hungarian People's Republic], the GDR, the PNR [Polish People's Republic], the USSR and the ChSSR [Czechoslovakian Soviet Socialist Republic] signed an agreement concerning multilateral scientific and technical cooperation on the problem of "The Creation of Methods and Equipment for the Automated Processing and Storage of Petroleum Industry Data and Field Geophysical Information." It is being carried out within the framework of the CEMA Standing Commission on Cooperation in the Area of the Gas and Oil Industry, under the direct leadership of the Interneftegeofizika Coordination Center, which was authorized and set up by the CEMA member countries and the functions of which are being performed by USSR Minnefteprom's [Ministry of the Petroleum Industry] Central Geophysical Expedition. More than 20 scientific and production geophysical organizations from the CEMA member countries are collaborating in it and providing a significant degree of international socialist division of labor in the field of automated processing of geophysical information.

Table 1.

Контракт (по форме) (1)	Количество контрактов (2)			
	(3) на совместную разработку	(4) заказных на опытно-методические работы и консультации	(5) на продажу совместных разработок	(6) всего
Двусторонний (7)	1	5	1	7
Трехсторонний (8)	8	—	—	8
Четырехсторонний (9)	5	—	1	6
Пятисторонний (10)	5	—	—	5
Шестисторонний (11)	3	—	—	3
Семисторонний (12)	—	—	1	1
Итого (6)	22	5	3	30

Key:
1. Contract (by form)
2. Number of contracts
3. For joint development work
4. Orders for experimental methodological work and consultations
5. For sale of joint developments
6. Total
7. Bilateral
8. Trilateral
9. Quadrilateral
10. Pentalateral
11. Hexalateral
12. Pentalateral

The program of scientific and technical research and development consists of two main sections: "Seismic Prospecting" and "Commercial Geophysics." Its main point is a provision for the creation and development of specialized software for the processing of seismic and commercial geophysical data. Essentially, it encompasses all the most timely areas of research in the field of seismic prospecting (the newest technological methods for studying the seismic wave field and so on) and commercial geophysics (equipment and methodological developments and so on).

Every year the program for joint work is laid out in detail and supplemented with new subjects and assignments. At the present time it contains 13 seismic and 9 commercial geophysical themes. By the beginning of this five-year plan, 14 subjects (7 in each section) had been covered.

Since 1977 the basic form of cooperation has been contracts. A new subject that is of mutual interest to all its co-executors is developed, according to a working plan, over a certain period of time. That part of it that must be carried out by contract is determined at the same time. Then there is a determination of the technical and financial capabilities of the countries involved, as far as carrying out the development work is concerned, as well as the degree of their interest in acquiring either the complete or partial results of the work.

The contracts that have been concluded differ in form, content and number of participants: multilateral for development; bilateral for joint development, with equal participation of the two countries in the expenses or a bilateral order for the performance of experimental and methodological research; bi- or multilateral for the sale of the results of joint developments (Table 1).

Most of the contracts (23 of 30) are multilateral and their subject is, as a rule, research in and development of algorithmic programming complexes. The principle of equal sharing of expenses by each participant is used in all the multilateral contracts.

The urgency of the problems being worked on and, undoubtedly, the utilization of the final results are matters of no little importance. The practical

Table 2.

Основные направления исследований и разработок (1)	Количество контрактов (2)										
	Страны-соразработчики (3)						Число стран (4)				Всего (11)
	НРБ (5)	ВНР (6)	ГДР (7)	ПНР (8)	СССР (9)	ЧССР (10)	3	4	5	6	
Специализированное математическое обеспечение (12)	—	—	1	—	1	1	1	—	—	—	1
Программы и исследования по проблематике прогнозирования геологического разреза (13)	2	3	7	3	8	8	4	2	1	1	8
Методика площадных сейсмических наблюдений и комплексы программ пространственной обработки данных (14)	3	1	3	3	3	3	—	—	2	1	3
Способы определения скоростной модели среды, комплексы программ исследования кинематических и динамических характеристик волн, преобразование сейсмической записи в глубинные разрезы (15)	1	3	3	3	5	5	2	2	1	—	5
Способы и программы подавления волн-помех, совершенствование цифровой фильтрации, коррекции статических поправок (16)	2	2	3	2	4	4	1	1	1	1	4

Key:

1. Basic areas of research and development
2. Number of contracts
3. Codeveloping countries
4. Number of countries
5. NRB
6. VNR
7. GDR
8. PNR
9. USSR
10. ChSSR
11. Total
12. Specialized software
13. Programs for research in problems involved in predicting a geological section
14. Techniques for areal seismic observations and complexes of programs for spatial processing of data
15. Methods for determining the velocity model of a medium, complexes of programs for investigating the kinematic and dynamic characteristics of waves, transformation of a seismic recording into a deep section
16. Methods and programs for suppressing interference waves, improvement of digital filtration, correction of static correction factors

interest in the results of research and a form for the realization of joint work that is mutually profitable economically are the basic factors that determine the high degree of international socialist division of labor. The latter is also insured thanks to the fact that the countries participating in the agreement have achieved approximately the same scientific and technical level in the area under discussion.

Table 3.

Страна (1)	Контракты, в которых участвуют страны (2)						Коэффициент многосторонности (9)	Эффект (10) сотрудничества	
	(3) двусторонние	(4) трехсторонние	(5) четырехсторонние	(6) пятисторонние	(7) шестисторонние	(8) всего		в машино-часах (11)	в человеко-месяцах (12)
НРБ (13)	—	—	1	4	3	8	5,4	947	285
ВНР (14)	—	1	3	2	3	9	4,8	1268	386
ГДР (15)	1	6	5	4	2	18	4,3	3313	1283
ПНР (16)	—	1	2	5	3	11	4,9	1209	431
СССР (17)	1	8	5	5	3	22	4,0	4005	1466
ЧССР (18)	—	8	5	5	3	21	4,1	4010	1210

Key:

1. Country
2. Contracts in which countries are participating
3. Bilateral
4. Trilateral
5. Quadrilateral
6. Pentalateral
7. Hexalateral
8. Total
9. Multilateralness factor
10. Effect of cooperation
11. In machine-hours
12. In man-months
13. NRB
14. VNR
15. GDR
16. PNR
17. USSR
18. ChSSR

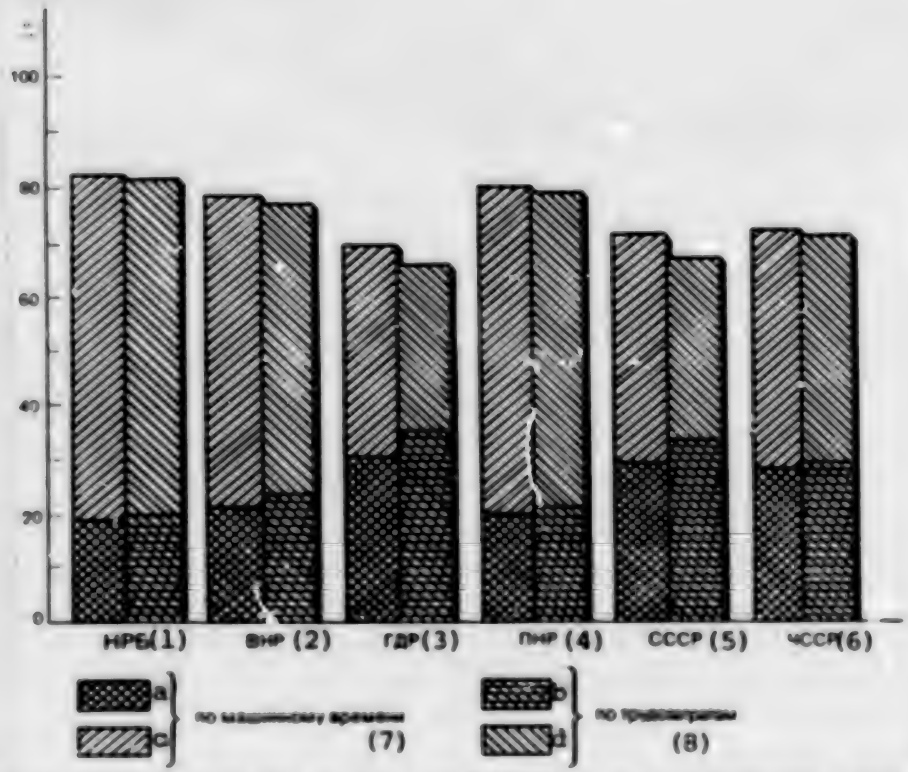
The participation of the countries in multilateral contracts in the main fields of research and development is illustrated by the data in Table 2.

In all the fields of investigation, several modern complexes and more than 100 separate data processing programs have been created and have made it possible to improve substantially the quality of the geological and geophysical results. It is important to note that all new developments are introduced almost immediately in the computer centers of the collaborating countries.

The distribution of the multilateralness factor for the countries participating in a certain number of contracts is given in Table 3.

Of special interest are the multilateral contracts for the sale of joint scientific and technical results to third countries. Two such contracts have been realized at the present time: a quadrilateral one for the sale to the VNR of the STsS-3 system of control and processing programs, which were developed jointly by the GDR, USSR and ChSSR; the other one is a heptalateral one for the sale to the Republic of Cuba of this same system and other seismic complexes of processing programs that were developed by all the parties to the agreement.

Bilateral contracts have been concluded for the performance of seismic work, on the basis of orders, using new methods and equipment. An example of this is the conduct of field investigations, using nonexplosive, pulsed wave excitation sources, by the USSR in the GDR and VNR, or borehole research by the polarization method of vertical seismic profiling, which was done in the ChSSR.



Contributions of countries to the realization of contractual work (a, b) and the economic effect (c, d) of cooperation based on the principle of equality of expenditures, as percentages of the codevelopers' total contribution.

Key:

1. NRB
2. VNR
3. GDR
4. PNR
5. USSR
6. ChSSR
7. Computer time
8. Labor expenses

An analysis of the data presented in the tables shows that:

the USSR, ChSSR and GDR participate most actively in contractual collaboration; they did the basic development work on the system of control and processing programs (STsS-3), the library of which is systematically replenished with new program complexes that are formulated for all the other areas of investigation. The comparatively low degree of participation by the NRB, VNR and PNR is explained primarily by all the difficulties related to the introduction of the results into the computers they are using, which are program-incompatible with the EVM YeS [Unified System of Electronic Computers], an insufficiency of personnel and technical capabilities, and--in a number of cases--the nonfeasibility of it, either because they have analogous software or because of the impossibility of using the information because of geological and geophysical considerations;

the greatest amount of contractual work is being done on the problem of predicting a geological section, which is the most urgent field of research in contemporary seismic prospecting, and the goal of which is the direct detection of gas and oil deposits;

on the average, the multilateralness factor in codevelopments is 4.5. This means that for each country, the jointly obtained scientific and technical results were cheaper by a factor of 4.5 and were produced about 2-3 times faster than if one country alone had done the work.

Each country's contributions to the realization of the contracts (see the figure on the preceding page) is expressed as the amount of work done by it, based on the principle of equality of expenditures. In separate cases, countries pay for some portion of their participation by compensating monetarily those countries that actually did the work. The effect of collaboration in the real indicators is determined as the difference between the total contribution of all countries and the contribution of an individual one to the realization of the contractual work under discussion and is 14,752 machine-hours, which is equivalent to a maximum daily load for 2 years for a third-generation computer, and 5,061 man-months, which is equivalent to 100 highly qualified engineers working for 4 years. Besides this, consideration should be given to the economic effect that is achieved from the acceleration of the research and development process and the introduction into the production process of joint scientific and technical results.

Simultaneously with the performance of this work by the Coordination Center and the collaborating organizations in the CEMA member countries, 20 contracts were drawn up and sent to national foreign trade organizations for signing. They provide for the further expansion of multilateral cooperation in the field of petroleum geophysics on the basis of an extension of the international socialist division of labor.

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GENERAL

ASSOCIATION PLAN FULFILLMENT FIGURES GIVEN

Moscow RAZVEDKA I OKHRANA NEDR in Russian No 4, Apr 84 pp 4-7

[Article: "Results of the All-Union Socialist Competition for 1983"]

[Text] In carrying out the decisions of the 26th CPSU Congress and the November (1982) and June (1983) Plenums of the CPSU Central Committee, the collectives of USSR Mingeo's [Ministry of Geology] organizations and enterprises fulfilled successfully their 1983 assignments and socialist obligations for increasing the reserves of most mineral resources. The five-year assignment for increasing the reserves of natural gas and apatites was completed. On the basis of the results of the "All-Union Socialist Competition for Improving Production Efficiency and Work Quality and the Successful Fulfillment and Overfulfillment of the Assignments of the State Plan for the Economic and Social Development of the USSR for 1983," the Volkovgeologiya, Yuzhukrgeologiya, Yakutskgeologiya, Khantymansiyskneftegazgeologiya and Uzbekneftegazgeologiya associations and the Turkmen SSR Geology Administration's Oil Prospecting Expedition have been awarded the Challenge Red Banners of the CC CPSU, USSR Council of Ministers, AUCCTU and CC VLKSM [All-Union Lenin Young Communist League] and have had their names entered on the All-Union Board of Honor at the VDNKh SSSR [Exhibition of Achievements of the National Economy of the USSR].

The collective of the Volkovgeologiya PGO [probably Geological Production Association] fulfilled successfully its assignments and socialists obligations for 1983. In comparison with 1982, work time losses and equipment down time were reduced. Savings in materials and fuel and energy resources resulted in the drilling of 192,400 m of boreholes. All of the association's drilling crews achieved the high drilling rate standards that the branch had set. The proportion of highly efficient drilling methods reached 91 percent. Modern, comfortable settlements were built for all the field subunits. In 1983 alone, 6,000 m^2 of living quarters and cultural and domestic projects for 456 people were introduced into use.

The collective of the Turkmen SSR Geology Administration's Oil Prospecting Expedition fulfilled its give-year plan for increasing gas reserves 2 years ahead of schedule. The assignment for 1983 was overfulfilled by 15.6 percent, and 17 wells were completed instead of the planned 11. The planned drilling amount [52,500 m] was exceeded by 613 m. In comparison with 1982, nonproductive losses of time were reduced by 3.5 percent, labor productivity rose by 8 percent, absenteeism was almost halved, material, power and raw material resources were

used more rationally, and there was an improvement in the quality of the geological prospecting work that was done. Thanks to the introduction of new prospecting techniques, 22 million rubles were saved. Domestic and cultural conditions are being improved constantly, and 1,800 m^2 of living quarters were introduced in 1983.

The collective of the Khantymansiyskneftegazgeologiya PGO overfulfilled its plan for increasing mineral resource reserves by 53.4 percent. Five new oil deposits were discovered. Drilling amounted to 231,865 m of deep boreholes, as against the planned figure of 230,000 m; testing of 64 boreholes (the plan specified 62) was completed; 80 drilling rigs were assembled (78 were planned); deep drilling was conducted in 14 large structures. The four-year plan for increasing oil reserves was fulfilled. Almost all the drilling crews changed over to the crew contract method of operation. The use of material and fuel and energy resources is being improved constantly, and an above-plan profit of 285,000 rubles was achieved. During the year, 15,516 m^2 of living quarters were constructed and put to use, a rest base was created, and a working personnel training school was opened. More than 500 workers were guests at holiday homes, sanitoria and dispensaries.

The Uzbenneftegazgeologiya association fulfilled the following assignments ahead of schedule: its five-year plan for confirming natural gas reserves (in only 3 years) and its plan for the first 3 years of the five-year plan for increasing gas, oil and condensate reserves. The productivity of 14 new areas has been established since the beginning of the five-year plan. USSR GKZ [State Commission on Mineral Resources] confirmed the reserves in four deposits in 1983. Construction of 58 wells was completed (120.8 percent of the planned figure) and 161,400 m of deep wells were drilled, as opposed to the planned figure of 160,000 m. The schedule speed reached 378 m/st.-mes [probably column-month], although the plan specified only 360 m/st.-mes. An above-plan profit of 16,000 rubles was obtained. All the crews are working by the crew contract method, and 41 percent of them achieved the standards set by the branch. Social problems are being solved successfully, and about 2,000 m^2 of living quarters and a kindergarten for 280 children were built in 1983.

The Yuzhukrgeologiya association overfulfilled by 12.8 percent its annual plan for increasing iron ore reserves. With its socialist obligation set at 477 million t, it found 506.8 million t, including 22 million t (110 percent of the planned figure) of rich ores. As a result of its prospecting in the Novopoltavskoye apatite ore deposit, there has been an increase of 21.6 million t (108 percent of the plan) in the phosphorus anhydride reserves. The assignment for finding underground water reserves for the city of Poltava's water supply was fulfilled and has been confirmed by USSR GKZ. Brown power-coal deposits from the Verkhnedneprovskoye deposit, in the amount of 147 million t, were confirmed by USSR GKZ and released for industrial exploitation. The core-drilling rate assignment was 104.1 percent fulfilled and the profit plan was overfulfilled by 3.2 percent. The assignment for saving material and fuel and energy resources was also overfulfilled.

The workers of the Yakutskgeologiya PGO overfulfilled their plan for increasing mineral resource reserves, including tin, by a factor of 2.5. Deposits of local construction materials and underground water were found. In all, 37

deposits were turned over for industrial exploitation during the first 3 years of the five-year plan, including 19 in 1983. The five-year plan for the confirmation of tin reserves by USSR GKZ was fulfilled ahead of schedule. The assignment for cutting mine workings was overfulfilled by 16 percent and that for core drilling by 2.6 percent. The assignment for economy of material and fuel and energy resources was also overfulfilled. The profit plan was 112 percent fulfilled. The above-plan living quarters that went into use amounted to 1,240 m^2.

For achieving high results in the "All-Union Socialist Competition," Challenge Red Banners of the CC CPSU, USSR Council of Ministers, AUCCTU and CC VLKSM were awarded to VIMS [All-Union Scientific Research Institute of Mineral Raw Materals], the Vostkazgeologiya and Uralkvartzsamotsvety [expansions unknown] associations, the Georgian SSR Geology Administration's Hydrogeological and Geological Engineering Expedition, and the Sarydzhazskaya and Usinsk Gas and Oil Prospecting Expeditions.

By 1 December 1983 (ahead of schedule), VIMS's collective fulfilled its plan and met its socialist obligations for scientific research work and completed six assignments under integrated, special purpose scientific and technical programs that are related to the solution of the most important scientific and technical programs. Although only 79 were specified in the plan, 97 scientific developments were introduced for production purposes. The production areas that were put to use amounted to 5,500 m^2. A profit of 750,000 rubles was obtained. Educational work and labor discipline were both improved.

The Vostkasgeologiya association overfulfilled its 1983 plan for increasing copper reserves by a factor of 3.3, lead by a factor of 2.8, zinc by a factor of 1.9, rare metals by a factor of 1.9 and underground water by a factor of 1.4. It also fulfilled its plan for USSR GKZ confirmation of tested lead, zinc and underground water reserves. The high promise of the Novo-Leninogorskoye polymetal deposit was also confirmed. Large deposits of rich polymetal ores were discovered in the Zyryanovsk ore region. The work was carried out with good technical and economic indicators. The assignment for the amount of mechanical core drilling was overfulfilled by 4.5 percent and the drilling rate was 9.7 percent higher than planned; the plan for the cutting of mine workings was overfulfilled by 7.7 percent. The assignments for economy of fuel, pipe, rolled ferrous metal goods and electricity were also overfulfilled, as was the profit plan (by 1.9 percent). Living quarters in the amount of 2,124 m^2 were built and subsidiary farms were organized. In 1983, the latter produced 575 t of meat and 128 t of milk.

In 1983, the collective of the Georgian SSR Geology Administration's Hydrogeological and Geological Engineering Expedition had the reserves of fresh underground water for the drinking and economic water supply for the city of Marneuli confirmed by USSR GKZ 3 months ahead of schedule. Reserves of fresh underground water were also confirmed for populated points in Samtredskiy and Abashskiy Rayons and the mineral water reserves in the Borzhomskoye deposit were reconfirmed; the data that were obtained resulted in a radical change in the ideas that were held about that deposit's hydrodynamic structure. Two new and promising sections were discovered. The TKZ [Territorial Commission of

Mineral Resources] confirmed reserves of mineral waters of the "Narzan" type, in the amount of 1,818 m^3 per day, in the Plate section. Detailed prospecting work for fresh underground water was done in order to improve the water supply for Tbilisi and nearby areas. The city will receive an additional 500,000 m^3 per day of fresh drinking water. Two vodozabory [translation unknown] have been put into operation in order to supply water to Rustavi and Kobuleti. Water for drinking and economic needs is being supplied to 22 national-economic projects more than were specified in the plan; these projects are directly related to the implementation of the Food Program. The number of fresh-water wells turned over for use was 97. The assignment for drilling work volume was overfulfilled by 16.4 percent, for drilling rate by 6.1 percent, and for profit by 1.5 percent. The quotas for saving resources and raw materials were also overfulfilled.

The Uralkvartssamotsvety association overfulfilled its plan for increasing the reserves of a number of minerals, included granulated quartz, iridescent agate, serpentine, amethyst and varicolored jasper. Above-plan commodity production was realized in the amount of 227,000 rubles. The plan for the realization of commodities for public consumption was 104.2 percent fulfilled, and the contractual obligations for deliveries was 105.5 percent fulfilled. The above-plan profit obtained was 328,000 rubles. According to standard net output per worker, labor productivity was 103.2 percent. Because of careful and economical use of resources, 204,000 kWh of electricity and 200 t of conventional fuel more than the established norms were saved. The association also put 576 m^2 of living quarters into use and made capital repairs on homes with a total area of 1,811 m^2.

The Usinsk NGRE [Gas and Oil Prospecting Expedition] overfulfilled its plan for increasing oil reserves by almost 100 percent and completed 103.9 percent of its five-year plan in 3 years. In 1983 it discovered one new oil field in the Khoreyverskaya Depression and five new deposits in the Khar'yaginskoye field. In accordance with the plan, deep drilling was begun in three new areas. The assignment for testing wells was overfulfilled by 50 percent, and the plan for amount of drilling by 9 percent. The results obtained in 1983 expand the prospects of the Upper Devonian and Silurian deposits in the Timano-Pechorskaya province and are making it possible to increase the oil reserves in the Usinsk oil-production region. The work was done with good technical and economic indicators. The workers' living, cultural and domestic conditions are being improved.

The collective of the Sarydzhazskaya GE [Geological Expedition] overfulfilled its plan for increasing tin and tungsten reserves by 3 percent in 1983. It completed preliminary surveying of the Kensu tungsten deposit and discovered the promising Molodezhnoye copper and molybdenum deposit in the Malosarychatskaya area. Work is continuing on the Trudovoye deposit and the flank of the Inyl'chekskoye ore field. The rates of borehole core-drilling and the cutting of underground workings were above the planned figures. All the crews are working under the crew contract method. Tutoring was developed extensively. Work is being done on the economical utilization of material, technical, fuel and energy resources. The profit plan was 103 percent fulfilled.

On the basis of the results of the "All-Union Socialist Competition for Challenge Red Banners," USSR Mingeo and the Central Committee of the Trade Union of Geological Prospecting Workers have honored the following collectives:

USSR Mingeo: the Aerogeologiya and Kirovgeologiya PGO's, and Severkvartssamotsvety and Yuzhmorgeologiya PO's [Production Association], the Gidrospetsgeologiya association's Hydrogeological Expedition No 15, the Neftegeofizika association's Geophysical Expedition for Prospecting Work, VSYeGINGYeO [All-Union Scientific Research Institute of Hydrogeology and Engineering Geology], VNIISIMS and VNIGNI [All-Union Petroleum Scientific Research Institute of Geological Exploration].

RSFSR Mingeo: the Krasnoyarskgeologiya, Sakhalingeologiya, Torfgeologiya, Uralgeologiya and Ukhtaneftegazgeologiya PGO's, the Tyumen Geophysical Trust, ZapSibNIGNI [probably Western Siberian Petroleum Scientific Research Institute of Geological Exploration], the Chuyskaya and Severo-Kuzbass [Northern Kuznetsk Coal Basin] Geological Prospecting, Leningrad Geophysical and Tyumen Thematic Expeditions, the Central Laboratory of Glavtyumengeologiya, the Primorgeologiya association's URS [Workers' Supply Administration] and Glavtyumengeologiya's subordinate Geolog Farm.

Ukrainian SSR Mingeo: the Sevukrgeologiya PGO, the L'vov GRE [Gas Prospecting Expedition] and the Novosanzharskaya NGRE.

Kazakh SSR Mingeo: the Yuzhkasgeologiya association's Surveying and Prospecting Expedition, the Taldy-Kurgan Hydrogeological Expedition, the Aktyubinsk Expedition for Geological Investigations of Boreholes, the Ural'skaya Geophysical Expedition and the Karaganda Geological Repair Plant.

Uzbek SSR Mingeo: the Samarkandgeologiya PGO and the Almalyk GRE.

Others honored are: the geology administrations of the Latvian, Lithuanian, Moldavian and Estonian SSR's, the Belorussian SSR Geology Administration's Central Geophysical Expedition, the Azerbaijan SSR Geology Administration's Nakhichevan Geological Prospecting Expedition, the Armenian SSR Geology Administration's Geological and Geophysical Expedition, the Kirgiz Integrated Geological and Geophysical Expedition, the Tajik SSR Geology Administration's Southern Hydrogeological Expedition and the Turkmen SSR Geology Administration's Motor Transport Office.

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MINISTRY OF GEOLOGY CREW AWARDS FOR 1983 LISTED

Moscow RAZVEDKA I OKHRANA NEDR in Russian No 4, Apr 84 pp 8-11

[Article by A.A. Shparev and V.P. Rozhkov, USSR Mingeo: "The Leading Crews in the Branch"]

[Text] On the basis of the results of the "All-Union Socialist Competition for Crews of Workers in Leading Professions" for 1983, USSR Mingeo's [Ministry of Geology] board and the Presidium of the Central Committee of the Trade Union of Workers in Geological Prospecting Work have recognized 34 core-drilling and 9 mineshaft-cutting crews as victors. Last year the geological organizations drilled almost 1 million m more than they did in 1982. All the republic organizations fulfilled the plan for the volume of drilling. The drilling rate was 609 m/st.-mes [probably column-month], or 103.6 percent of the plan; in comparison with 1982, it increased by 21 m/st.-mes. Almost all the organizations, with the exception of the geology administrations of the Tajik and Moldavian SSR's, managed to cope with the assignments for increasing the drilling rate. The increase in the amount of drilling was the result solely of an increase in labor productivity, because the number of drilling crews decreased slightly in 1983. The standards set in the branch were met by 1,370 crews, or 33 percent. More than 70 percent of the crews worked under the crew contract method; 13 crews completed their five-year assignments in 3 years, and 115 collectives completed their assignments for the first 4 years of the five-year plan.

Drilling Foreman V.A. Tyurikov's crew, from the Irkutskgeologiya association, was the first in the branch to complete its five-year plan and is close to completing its assignment for the sixth year. During the year it drilled 10,752 (158.1 percent of the plan) of boreholes with a depth of 372 m through rock that averaged Category 9; the average drilling rate was 972 m/st.-mes. The drilling was done with a ZIF-650M rig with an SSK-59. Because of saved means, the crew drilled 1,536 m in 3 years, of which 576 m were drilled in 1983. The collective works under the crew contract method and shares its experience in organizing the work with other drilling crews in the expedition; a school for progressive experience has been set up on the basis of V.A. Tyurikov's crew.

More than 26,000 m have been drilled since the beginning of the five-year plan by the crew of Drilling Foreman V.V. Yakovlev from the Murmansk GRE [probably Gas or Geological Prospecting Expedition]. Although the planned figure for

1983 was 5,510 m, it drilled a total of 8,208 m of boreholes with a depth of 1,470 m through rocks that average Category 8.3. The crew mastered successfully the technology of diamond drilling with the SSK-59 and SSK-46. The boreholes were drilled with ZIF-650M and ZIF-1200MR rigs, with high rates of revolution of the drilling string and the use of emulsion-type flushing liquids. The crew drilled 390 m because of saved means in 1983. Drilling Foreman N.I. Meshcheryakov's crew, from the Mayskiy GRE is completing its four-year plan while working under difficult geological and climatic conditions in Magadan Oblast. The plan for the first 3 years of the five-year plan was completed on 1 May 1983. The amount of drilling done was 9,000 m (125 percent of the plan), with borehole depths of up to 700 m through rocks that averaged Category 8. The drilling was done with a ZIF-650M rig with an SSK-59. Working under the crew contract method, during the year the crew saved 7,000 rubles' worth of material and technical resources, because of which it was able to drill 800 m.

The collective from the Yuzhukrgeologiya association that is led by V.F. Pugachev drilled boreholes with an average depth of 1,500 m, using a ZIF-1200MR rig. The rock averaged Category 4.2. During the year the crew drilled 5,152 m, as opposed to the planned figure of 3,550 m. The drilling rate was 500 m/st.-mes. An economical attitude toward material and technical resources enabled the crew to save 4,000 rubles' worth and drill 167 m because of the savings. Prospecting for iron ore deposits is work done by the crew from the Minusinsk GRE that is led by Drilling Foreman O.A. Saltanov. The collective completed its four-year assignment in July 1983, having drilled 14,405 m of boreholes with a depth of 300 m through rocks that average Category 10. It is now completing its five-year assignment. The drilling was done with a ZIF-650M rig that was fitted with monitoring and measuring equipment. Light-alloy drilling pipe was used extensively. Emulsion-type flushing liquids were prepared in a mobile, mechanized station. The boreholes, most of which were slanted, were drilled at an average angle of 75° to the horizontal. About 80 percent of the drilling volume was done with bits with d = 59 mm, which increased the drilling rate substantially and reduces sharply the consumption of materials. Mastery of the crew contract method enabled the collective to reduce drilling time by more than 12 percent. The entire crew now has a proprietary attitude toward the use of materials and tools. During the year, it saved 2,700 rubles' worth of them, which enabled it to drill 452 m.

I.F. Miroshnichenko's crew, from the Gorlovka GRE, was engaged in prospecting in the deep sections of coal fields below the technical boundaries of existing shafts. This work will make it possible to keep the extraction of coking coals in the oldest coal-extraction region of the Donbass [Donets Coal Basin] at the present level. Working under the crew contract method, the collective led by I.F. Miroshnichenko drilled four deep boreholes and began a fifth one in 3 years. The total amount of drilling was 8,880 m, at a rate of 300 m/st.-mes as against the planned figure of 194 m/st.-mes. The amount of time spend working was reduced by 120 days. Having mastered quite well the technological process of drilling deep boreholes that intersect underground workings, the crew handled its assignments successfully. Up until August 1983 the drilling was done with a BA-2000 rig, and then--on the drilling foreman's initiative--the crew became one of the first in the association to master and introduce the new, highly productive SKB-8 rig. Timely maintenance and an intelligent attitude toward

the technology insured uninterrupted operation of the equipment. The crew's high qualifications and personnel stability also contributed to the achievement of high technical and economic indicators. By 19 August 1983 it had fulfilled its annual plan, and on 15 October it reported that its four-year plan was completed.

Drilling Foreman S.D. Povoroznik's crew, from the Tsentrkazgeologiya association, used a KGK-100 complex to drill more than 210,000 m in 3 years, at an average rate of 13,924 m/st.-mes. In 1983 the figure was 14,811 m/st.-mes. The collective works under the crew contract method. A high degree of organization of labor, the absence of down time and disruption of labor and production discipline, and the economical utilization of material and technical resources enabled the crew to complete its five-year assignment ahead of schedule. Materials concerning this crew's work experience have been recommended for display in the Geology Pavilion of the VDNKh USSR [Exhibition of Achievements of the National Economy of the USSR]. In addition, the pavilion will also have materials on the work done by the crews led by V.A. Tyurikov, V.V. Yakovlev and I.F. Miroshnichenko.

Foreman I.P. Kazarin's crew, from the Vostkasgeologiya association fulfilled its assignment for the first 4 years of the five-year plan in August 1983. During the year it drilled 4,759 m, as opposed to the planned figure of 3,570 m. Boreholes were drilled to a depth of 1,170 m, through rocks that averaged Category 10.2, with a ZIF-1200MR rig with high rates of revolution of the drilling string. Having mastered the drilling technology completely, the crew worked without accidents, which situation was also facilitated by constant monitoring of the drilling rig's status. For the purpose of shortening the time required to carry out its assignments, the crew mastered the equipment and technology for multishaft, controlled directional drilling. Drilling Foreman S.P. Antidze, from the Central Georgia Expedition, was awarded the high title of USSR State Prize laureate in 1983. With a planned figure of 5,400 m, his crew drilled 6,535 m to depths of more than 500 m, through rocks that averaged Category 7. The drilling rate was 544 m/st.-mes. Material and technical resources worth more than 2,000 rubles were saved, as a result of which the crew drilled 504 m.

Since 1974, P.Ya. Tyrykin's crew from the Berezovgeologiya association has constantly been among the winners of the All-Union socialist competition. Using new equipment and progressive technology, it is a model of the communist attitude toward labor. The collective's work is characterized by stability and constant growth of its technical and economic indicators. In 1983 the drilling rate was 1,765 m/st.-mes, in comparison with 443 m/st.-mes in 1971. The plan for the 11th Five-Year Plan was fulfilled on 29 October 1983. The crew drilled 60,000 m of boreholes to depths of more than 400 m through rocks that averaged Category 8. Because of saved means, 2,580 m were drilled in 3 years. Since May 1983, P.Ya. Tyrykin's crew has been carrying out an assignment from USSR Mingeo to explore a coal field in the Tuva ASSR. Working under new conditions, it used the SSK-59 complex for the first time and achieved an average monthly rate of more than 1,700 m and a high core output rate. A school for progressive experience is in permanent operation at the crew's base.

Other winners in the All-Union socialist competition were the crews of Drilling Foremen V.Ya. Gubin, V.L. Startsev, M.S. Osipov, M.G. Bryanskiy and Ya.D. Vasil'yev from RSFSR Mingeo, N.N. Reshetnyak and V.F. Kosolapov from the Ukrainian SSR Mingeo, A.A. Yanshin and N.M. Kazbanov from the Kazakh SSR Mingeo, N. Ibrishev and N.N. Smirnov from the Uzbek SSR Mingeo, Ya.R. Kukaysin from the Latvian SSR's Geology Administration, I. Kurmankulov from the Kirgiz SSR's Geology Administration, Kh. Kul'metov from the Turkmen SSR's Geology Administration, M.S. Boshyan from the Armenian SSR's Geology Administration, I.A. Skutel'nik from the Moldavian SSR's Geology Administration, T. Sadykov from the Tajik SSR's Geology Administration, N.S. Yankovich, A.P. Karbovnichiy, F.I. Berezhnyy, V.M. Nikitayev and S.I. Belov from the Soyuzgeologorazvedka VGO [probably All-Union Geological Association], A.K. D'yachenko from the Gidrospetsgeologiya association and N. A. Zhigalev from the Soyuzkvartssamotsvety VPO [All-Union Production Association].

However, many core-drilling crews are still managing to do their assignments. In 1983, 78.4 percent of the total number of crews fulfilled their assignments. Although there was an undoubted positive shift in comparison with 1982, in 1983 the geological organizations need to intensify their work in this field so that there will be no lagging crews.

On the whole, USSR Mingeo fulfilled its 1983 assignments for the volume and rate of cutting of underground mining and prospecting shafts and met its socialist obligations. In all, 291,700 m of shafts were driven. In comparison with 1982, the shafting volume increased by 4 percent. The average monthly rate reached 146 m per crew (the assigned figure was 140 m); that is, 5.3 percent more than in 1982. The rate for driving mine shafts rose by 34.3 percent and was 27.8 m per crew per month. Productivity per single underground working remained at the 1982 level, but for the driving of mine shafts it increased by more than 50 percent. Because of saved material, technical, fuel and energy resources, the shaft-cutting crews drove 5,372 m of underground workings. The entire increase in cutting volume came about because of an increase in labor productivity without increasing the number of cutting crews. The cutting of the underground mine workings was done by 226 crews, of which 106 worked under the crew contract method; 73 crews achieved the standards established by the branch. The planned assignment for cutting underground workings was fulfilled by 183 crews, and 19 of them completed their assignment for the first 4 years of the five-year plan. In the Georgian and Azerbaijan SSR Geology Administrations, the annual planned assignments were not fulfilled by 58.3 and 33.4 percent, respectively, of the shaft-cutting crews because of inadequate attention to improving the organization and planning of labor, whereas the assignments for the cutting of mining and prospecting workings in these administrations were 91.1 and 93.8 percent fulfilled.

The communist labor shaft-cutting crew led by S.V. Gorbushko, from the Sevvostgeologiya association's Mayskaya GRE, was a winner in the All-Union socialist competition for the 10th time since the beginning of the five-year plan. In carrying out the exploration of an ore deposit under severe polar conditions, the collective was one of the first in the branch, on 28 March 1983, to report the completion of its plan for the first 3 years of

the five-year plan, and on 14 December of the completion of its assignment for the fourth year. The crew drove more than 2,500 m of additional underground workings. Over the 3-year period, the total length of the horizontal workings (with a cross-section of 5.8 m^2) that were cut through permanently frozen Category XV rocks was about 11,000 m, with the productivity per cutter being 20.4 m per month. The crew has been working under the crew contract method since 1981. An economical attitude toward materials, tools and electricity enabled it to drive 221 m of mining and exploration workings on the basis of saved resources.

In 1983, S.V. Gorbushko's crew, with its full staff of 10 cutters, drove 3,206 m of mine shafts. The achievement of a high productivity level per cutter (20.5 m/month as against the planned figure of 17 m/month) enabled it, without additional expenditures and with the same series-produced equipment, to cut 206 m of above-plan shafts. The brigade works on a four-shift schedule with 6 working days. A section made up of two cutters attacks the face with PR-30 drills, which have axial flushing with a salt-and-water solution and PAV [possibly surface-active agent] additive; the depth of the shot holes is 1.9 m. The rock is removed by a PPN-1s loading machine and put into UVG-1.3 closed cars, after which it is hauled away by 4.5 ARP-2M electric locomotives. The faces are ventilated by a combined method, with SVM-5 and SVM-6 blowers. Because of an improvement in equipment operation and the organization of labor and the economical use of materials and energy resources, the crew saved 3,000 rubles in 1983 and drove 71 m of workings because of saved means.

The shaft-cutting crew led by USSR State Prize laureate V.T. Mishchenko, from the Sevvostokgeologiya association's Dukatskaya GRE, also works under complicated geological and climatic conditions in a remote region. The crew's collective, which was the initiator of a competition for the early fulfillment of the 1983 plan and the assignments for the 11th Five-Year Plan, completed successfully the obligations it had assumed. Although the planned figure for the first 3 years of the five-year plan was 7,300 m, this crew drove 9,269 m of mine shafts, of which 146 m were done with saved means. Having fulfilled the 1983 plan (2,500 m) on 2 November, the crew drove another 459 m of workings by the end of the year, with cutter productivity being 14.7 m/month. A clearcut organization of labor and strict labor and production discipline enabled the collective to achieve a systematic reduction in the estimated cost per meter of cutting and save materials, tools and electricity. In 1983, it drove 95 m of mine shafts because of saved resources.

Among the best shaft-cutting crews in the branch that were announced as winners in the All-Union socialist competition was N.M. Gormash's communist labor crew from the Kirgiz SSR Geology Administration's Sarydzhazskaya GRE. It was engaged in exploring the Trudovoy tin and tungsten deposit, which is of great importance for the future development of nonferrous metallurgy in Central Asia. Working at a high technical level, during the 11th Five-Year Plan the crew has been a winner in the All-Union socialist competition every year. During the last 3 years it has driven 7,369 m of underground workings, as opposed to the planned figure of 6,866 m, and has saved 91,000 rubles' worth of materials and electricity. Having addressed the collectives of all crews in the branch about the further development of socialist competition for the fulfillment of the

1983 and 11th Five-Year Plans ahead of schedule, the crew led by N.M. Gormash used a high-speed method (more than 150 m per crew per month) in 1983 to drive 2,204 m of horizontal mining and exploration shafts with cross-sections of 6.4 and 5.8 m^2 in Category XVIII rocks. Productivity per cutter reached 17.5 m/month, against the planned figure of 13.9 m/month. By working under the crew contract method, the crew was able to save material and energy resources worth 38,000 rubles and drive 130 m of mine shafts with saved means.

G.V. Yakovlev's communist labor crew, from the Samarkandgeologiya association's Zarmitanskaya GRS, works under the motto "No One Lags Behind." In 1983 it drove 3,414.9 m of horizontal mine shafts and overfulfilled its plan by 13.4 percent. Productivity per cutter exceeded the planned 15.9 m/month by 3.1 m/month. The crew members' economical attitude toward materials and electricity enabled it to drive an additional 30 m of workings on the basis of saved means.

The communist labor collective headed by G.L. Nartikoyev, from the Krasnokholmskgeologiya association, cut haulage and exploratory cross-cuts, a raise and engineering (chamber-type) workings in Category XVII rocks. In all, it cut 4,414 m of horizontal mine shafts with a cross-section of 6.4 m^2. In connection with this, the crew had the highest productivity rate in the branch: 29.9 m per cutter per month, against the planned figure of 20 m. Chamber-type workings amounted to 344 m, with cutter productivity at 12.3 m/month. The crew achieved these indicators because of a high degree of organization of labor and the use of new equipment and progressive technology. The shot holes were drilled with LKR-U thrust columns, with one cutter servicing up to three columns at the same time. Only direct and spiral cuts (k.i.sh. [expansion unknown] 0.98) were used. KShN spindle bits, which have given a good account of themselves, were used when driving through heavily fissured rock. Tippable platforms on rollers and fast-release pipe connections made it possible to reduce the rock-loading time considerably and build up the distribution lines. The raise was driven with the help of a PShchB-2 heading machine, in connection with which the productivity per cutter was 9.7 m/month. The collective works under the crew contract method, and monthly salary distribution is done with the KTU [expansion unknown] taken into consideration. The rational use of material and fuel and energy resources made it possible to save 2,200 rubles.

For the first time, R.G. Znachkov's crew from the Azerbaijan SSR Geology Administration's Malokavkazskaya GRE was a victor in the All-Union socialist competition. It drove 1,180 m of mining and exploration shafts, with cross-sections of 5.8 and 6.4 m^2, through Category XVIII rocks. Against the planned rate of 15 m/month, cutter productivity reached 17.6 m/month. The savings amounted to 6.1 t of pipe and rolled metal, 9.7 t of conventional fueld and 5,400 kWh of electricity; as a result of these saved means, the crew drove 16 m of mine shafts. The right to regard themselves as the best in the branch was also won by the crews of I.P. Korolev from the Armenian SSR's Geology Administration, V.Kh. Elizar'yev from the Tajik SSR's Geology Administration and V.G. Konstantinov from the Sosnovgeologiya association.

USSR Mingeo's board and the Central Committee of the Trade Union of Workers in Geological Prospecting Work congratulated the collectives of the crews who were

winners of the All-Union socialist competition and expressed their confidence that the workers, engineering and technical personnel and employees of geological organizations, having developed extensively the competition for the fulfillment and overfulfillment of the 1984 plan and the assignments for the 11th Five-Year Plan, will achieve new successes in the business of the future development of this country's mineral raw material base.

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GENERAL

GOSPLAN REVIEWS KAZAKHSTAN"S ELECTRIC POWER PROGRAM

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 5, May 84 pp 74-75

/Article: "Accelerated Pace of Development for Power Engineering"/

/Text/ A meeting of the Gosplan /State Planning Committee/ discussed the current status and development of the field of power engineering in the Kazakh SSR for the years 1986-1990 and up to the year 2000. Taking part were heads of the ministries, offices, construction/assembly, repair, scientific research and project design organizations.

T. G. Mukhamed-Rakhimov, vice chairman of the Council of Ministers of the Kazakh SSR and republic chairman for Gosplan, gave a report.

The speaker stated that the present stage of economic growth of the country is characterized by a tangible increase in the role of electrification not only in the technological re-equipment of the economy, but also in the handling of the most vital social and economic concerns.

An immense fuel and power system has been constructed in Kazakhstan, whose subsidiaries constitute a third of the primary producer goods of the entire industry. With every five year period the republic is enlarging its share of the fuel and power system of the country and firmly maintaining its second place in production of petroleum in the country and its third place in coal production and generation of electricity.

Vast changes have taken place in the development of the power industry in the past 20 years. During this time the production of electricity has risen fourfold and by 1984 reached nearly 70 billion kWh, while the installed power of the electric power plants has increased more than threefold. This has improved the availability of electricity for the ever increasing needs of the national economy, that of households and service institutions, as well as to complete the electrification of agriculture and enable its conversion to an industrial basis.

A major event in the development of the power industry not only in Kazakhstan, but in the entire country, was the adoption by the CPSU Central Committee and the USSR Council of Ministers of the resolution "Creation of the Ekibastuz Fuel and Power Complex and Construction of the 1,500 Kilowatt Direct Current Ekibastuz/Tsentr Station Transmission Lines." The organization of this system comprising five GRES's /state regional electric power stations/ with an overall power of 20 million KW will not only meet the electricity needs of the republic, but also distribute the electricity to the central and eastern territories of the country.

Hydroelectric stations, being the most economical, play an important part in meeting the power needs. Hence, the expansion of their capacities will be continued.

The work teams of the enterprises, construction sites and organizations of this sector in the republic have done quite a lot to increase the power capacities; however the electricity demand still outstrips the available production capacities.

Therefore, the speaker emphasized, the power engineers of the republic are confronted with an extremely urgent task--to guarantee the steady operation of existing power stations and boost the production of electricity.

In analyzing the reasons for the serious shortcomings in the operation of the sector, the speaker pointed out that the Ministry of Power of the republic found itself unprepared to take on and efficiently incorporate the new facilities. The power blocks of Ekibastuz GRES-1 had been certified with much work unfinished, and there was a shortage of trained operators.

The power and heat generation falls short of the levels of development recommended by the heating systems. An especially serious shortfall was tolerated in the cities of Alma Ata, Karaganda, Ust-Kamenogorsk, Tselinograd, and Semipalatinsk. Despite the critical situation of the heat balance, the Ministry of Power displays a lenient attitude toward underutilization of the heat facilities.

The speaker described the chief development trends of the power industry over the long range. The main effort is being devoted to greater use of local fuel and water-generated power resources, which will form the basis for modern electric power stations. The developmental prospects of the sector have been determined from forecasts of the electricity consumption of all the sectors of the economy and the volumes of electricity required for export outside the republic. The accelerated development of the sector will be achieved by further intensification of the production processes through widespread adoption of advanced electrical engineering facilities to significantly replace the liquid fuel during production.

A great economic impact is provided by radical increase in the frequency and tension of the electricity distributed to the consumers, bringing it up to the State Standard. Plans call for significant upgarding of the level of centralization of the heat supplied to the cities and adoption of the most sophisticated heating systems in rural localities.

Among other large scale measures are the widespread adoption of scientific and technical inventions by the existing thermoelectric power stations to lower the organic fuel outlay, reduce repair costs and replace inflexible or obsolete units; improved management of the electricity network; development of automation; and adoption of computers.

Special concerns are the faster rate of development of the Ekibastuz and construction of the first section of the Turgay power and fuel systems, as well as steady adherence to energy-saving policies.

The successful accomplishment of the scheduled large scale projects, according to the speaker, requires close coordination of the efforts of many ministries, offices, scientific, project development and prospecting outfits. The Gosplan, ministries, government offices, oblast spolkoms, and the Alma Ata Gorispolkom should thoroughly explore the subject of structural improvements of the economy when formulating their future and current plans, in order to enhance the energy efficiency. This requires a further centralization of the heat supplied to the cities from thermoelectric plants and rayon boiler houses and continue electrification of agriculture from these power systems.

Measures should be taken to enlarge the share of nontraditional energy sources and transform the fuel utilization structure for generation of heat and electricity with a substantial cutback in furnace fuel oil and widespread incorporation of secondary energy resources in the economic cycle.

The Ministry of Power of the republic, together with the Sredazremenergo Production Union, should maximize the conversion of repairs to an industrial footing and take steps to speed the construction of TsMRZ /possibly Centralized Mechanized Plant Maintenance Unit/ within the city of Ekibastuz, along with repair shops, and to enlarge the production base of the Yuzhkazenergoremont enterprise. The problem of pollution requires the utmost attention. The ministries, government offices and oblast executive committees should proceed on the basis that environmental protection is becoming a specific form of economic activity and is an integral part of social production.

Taking an active part in the meeting were K. A. Abdulayev, first deputy minister of power engineering and electrification of the Kazakh SSR; B. G. Nurzhanov, general director of the Ekibastuzenergo Production Association; A. K. Tomashets, deputy minister of agriculture

of the republic; V. I. Yefimov, vice chairman of the Pavlodar Oblispolkom; N. V. Vologdin, director of the Kazakh division of the Gidroproyekt Institute; V. G. Presnyakov, vice chairman of the Kokchetav Oblispolkom and chairman of the oblast planning commission; E. S. Doylido, general director of the Sredazremenergo Production Association, and others. After approving the basic thesis of the report, they discussed the work being done to assuring a stable operation of the collective of the sector and enlarging the operating resources of the construction/assembly and repair organizations. They also mentioned a number of problems requiring immediate solution.

Their remarks were especially concerned with the subjects of capital construction and how to overcome the delays in this area, stressing the need for better discipline and organization in all branches of the sector, radical improvement in the design process, consistent implementation of energy-saving measures, and a reliable source of energy for farming.

The speakers stated that discussion of the topic by the planning committee and implementation of its adopted resolution could substantially increase the generation of heat and electricity and improve the technical and economic indicators of the sector. This would significantly enhance the reliability of the energy supply for agriculture of the republic in future.

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4 Oct 1984